

Nature *Magazine*

VOLUME 45

NUMBER 4



APRIL 1952

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Briefly Noted

Your Dog. By Robert Leighton. New York. 1952. The British Book Centre. 128 pages. Illustrated. \$1.00.

A handy, pocket-size little book on the various breeds of dogs, their selection, care, breeding etc.

Your Cat. By P. M. Soderberg. New York. 1952. The British Book Centre. 118 pages. Illustrated. \$1.00.

A companion book to *Your Dog*, treating with the varieties of cats and their care.

Campfire Adventure Stories. By Allan A. Macfarlan. New York. 1952. The Association Press. 225 pages. \$2.95.

Three novelettes and six short stories of life in the wilds of Maine and Canada.

Dancing Tails and Other Fish Jingles. By Edward W. Allen. Seattle. 1952. Mitchell Publications. 95 pages. Illustrated by Dorman H. Smith.

Humorous jingles about fishes by the Chairman of the International Fisheries Commission. The artist is an internationally known cartoonist who obviously enjoyed illustrating Mr. Allen's verses.

A Mother Goes to War. By Helen Jones. New York. 1951. The William-Frederick Press. 48 pages. \$2.00.

A sonnet sequence of mature poems by one whose heart is with a son on the battlefield in Korea.

Man Answers Death. Edited by Corliss Lamont. With an introduction by Louis Untermeyer. New York. 1952. Philosophical Library. 330 pages. \$4.50.

The second edition of an anthology of poetry that centers around the Humanist philosophy of existence and stresses the attitude that the best of all answers to death is the whole-hearted affirmation of life in terms of freedom, joy and beauty.

Birds of an Iowa Dooryard. By Althea R. Sherman. Boston. 1952. Christopher Publishing House. 270 pages. \$3.75.

This is a record of a lifetime of bird observation by one who wrote extensively for bird journals. Her records have been edited by Fred J. Pierce, Iowa bird authority, and an introductory biography is supplied by Arthur J. Palas.

Food, Farming and the Future. By Friend Sykes. Emmaus, Pa. 1952. Rodale Press. 294 pages. Illustrated. \$4.50.

The story of farming on the wind-swept Salisbury plain in England, where his achievement in production of crops and meat animals seemed impossible.

Alpine Glaciers. By A. E. Lockington Vial. New York. 1952. The British Book Centre. 126 pages. Illustrated. \$6.75.

Splendid pictures and popular discussion of the glaciers of the Alps.

The Roe Deer. By Harry Tegner. New York. 1952. The British Book Centre. 176 pages. Illustrated. \$7.50.

An authoritative discussion of one of the loveliest of British animals.

The Secret of Barnegat Light. By Frances McGuire. New York. 1952. E. P. Dutton and Co. 128 pages. Illustrated by Albert Orbaan. \$2.50.

A story for youngsters about life on Barnegat Bay and about the famous lighthouse.

We Are A Family. By Inez Hogan. New York. 1952. E. P. Dutton and Company. 93 pages. Illustrations by the author. \$2.75.

Simple text and amusing pictures that give children a feeling of kinship with various animals.

Bulletins Received

"The Golden Mantled Ground Squirrel," by Ralph R. Huestis. A special number of Crater Lake Nature Notes published by the Crater Lake Natural History Association, Crater Lake National Park, Oregon. 15 cents. . . "Annotated List of Birds of Barro Colorado Island, Panama Canal Zone. By Eugene Eisenmann. Publication 4058, Smithsonian Institution, Washington, D.C. . . "Guide for Resource — Use Education Workshops." Published by The American Council on Education, 1785 Massachusetts Avenue, N.W., Washington 6, D.C. . . "An Analysis of the Distribution of the Birds of California." By Alden H. Miller. University of California Press, Berkeley 4, Cal. \$1.50. . . "Education and National Security." National Education Association, 1201 16th St., N.W., Washington 6, D.C. 50 cents. . . "Historic Garden Week in Virginia." The Garden Club of Virginia, Hotel Jefferson, Richmond, Va. . . "Lead Poisoning in Wild Waterfowl." By James S. Jordan and Frank C. Belrose. Natural History Survey Division, State of Illinois, Urbana, Illinois. . . "The Role of Conservation in the Education Program of Latin America." By Annette L. Flugger. Pan American Union, Washington, D.C.

Under the Sea-wind

Under the Sea-wind. By Rachel L. Carson. New York. 1952. Oxford University Press. 314 pages. \$3.50.

When this book first appeared in 1941 it was favorably reviewed but enjoyed a modest sale. Recently, however, the author's splendid *The Sea Around Us* climbed to the top of the best-seller list and has been widely and enthusiastically received, as it deserves to be. As is often the case, readers asked what else the author has written, so now comes, in response to demand, a second printing of the earlier book, a volume as full of fine writing and fascinating fact as the recent best-seller. We would not be surprised to see this book take its place in public affection with the author's recent masterpiece.



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Nature in Print

By HOWARD ZAHNISER

APRIL most assuredly is John Burroughs' month of all months, and we are most fortunate to have at hand for this April the volume that Farida A. Wiley has recently edited with the title *John Burroughs' America: Selections from the Writings of the Hudson River Naturalist*. The startlingly vivid and revealing illustrations by Francis Lee Jaques, a foreword by John Burroughs' son Julian, and the editor's introduction, together with the volume's nearly 300 pages of well chosen selections from Burroughs' Nature writings — printed in large type on pages as fresh and pleasant to look upon almost as Mr. Jaques' drawings, or April itself — make this a volume to delight in having. Its index, list of Burroughs' books, and listings of the sources of the selections give it an added value as a convenient key to the further reading that it may well inspire.

Fifteen years ago, in another April *Nature Magazine*, observing the hundredth anniversary of Burroughs' birth, we quoted his physician, companion, editor, and Boswell — Clara Barrus — as remembering "how unusual the word 'April' sounded upon his lips" and saying, "Until I heard him speak it, I had not realized how beautiful a word it is." Browsing through Clara Barrus' two volumes entitled *The Life and Letters of John Burroughs*, we skipped from April to April, noting the farm boy with hylas piping in his hand, the seventeen-year-old school teacher homesick at the sound of peepers at twilight in April, April days in the Nation's capital (as a Treasury clerk, friend of Walt Whitman, and wanderer in Rock Creek Park), an April with Theodore Roosevelt in Yellowstone National Park, and another with John Muir in the West. From Burroughs' own works we gathered together a few of the April descriptions with which his writings are conspicuously abundant — more so, one is almost certain, than for any other month of all the year. April, we observed, was indeed to Burroughs what he once called "the mother month," and we found "more than a passing interest in the April coincidents in his life" — from the third of April in 1837, when he was born in a farmhouse of Delaware County, New York, until the eighty-fourth anniversary of that day when, on April 3, 1921, his body was lowered into the earth of that boyhood farm.

Once John Burroughs wrote, "I think April is the best month to be born in. One is just in time, so to speak, to catch the first train, which is made up in this month. . . . In April all Nature starts with you." On another occasion — thinking then of the passing of Matthew Arnold, who along with Whitman and Emerson had influenced him greatly — he commented that "April can make even death beautiful." Soon after his fifty-first birthday, in his journal for April 27, 1888, he confided to himself that, "A perfect day in April surpasses all others. Its sweetness, freshness, uncloyingness, and a sort of spirituality, can be had at no other time." Despite our own birth times, despite our residence perhaps in other latitudes than his, where seasons may vary from ours in their appearances, surely we can on reading Burroughs exclaim with him, "Welcome to April, my natal month; the month of the swelling buds, the springing grass, the first nests, the first plantings, the first flowers, and, last but not least, the first shad."

Welcome also to Farida Wiley's new presentation of John Burroughs and his writings! We have been needing such a work,

for we have, I fear, been accumulating in our general reading a Burroughs deficiency. Miss Wiley, Mr. Jaques, and their publishers have provided us a most palatable corrective for this undernourishment.

It would be a misfortune for us to lose John Burroughs from our consciousness. Yet the general readers, even of outdoor essays, have apparently been enduring such a risk for some years now. Both here at home and at my office — where personal books, alas, keep the shelves full until crowded out — I myself have sets of Burroughs' work, each of which has cost me no more from secondhand book dealers than the price of this one newly published volume (which, incidentally, is reasonably priced). With all due regard for an unusual although customary good fortune in second-hand book stores (the recompense, perchance, of frequent visits and eternal vigilance in such surroundings), the availability twice in a decade of such "bargains" is prima facie evidence of a poor appetite for these volumes among other browsers.

Not long ago, during a conversational trailside relaxation in a wilderness backpack trip, I heard it confessed that casual readings from a Burroughs volume taken from the shelf after some years had proved less than satisfying, failing to bring new knowledge or fresh understanding in keeping with the investment of reading. Enjoying as I do the relaxation and amiable companionship of Burroughs' own simple writings, I must admit that this is not my own experience. Nevertheless, this laying aside of Burroughs' writings for those more recent ones with deeper understandings and an increased richness of fact is apparently a characteristic of our reading public.

It is one that can be appreciated, too. As Norman Foerster judged some thirty years ago in his volume *Nature in American Literature*, "His substance commonly wants variety and importance; his style, progress and emphasis." In Burroughs' writings, Professor Foerster opined, "We are given not only the gold but much of the sand — here and there a striking idea or figure, and all the rest repetition or platitude." As Professor Foerster pointed out further, even though Burroughs' "short, leisurely sentences and loose rhythms carry no suggestion of the grandeur of the horizon, the sea, and the starry movements, they are at all events intimate with the slow animals and the manifold detail of the grass."

It has simply been our fortune to be crowded away from such an intimacy and constantly attracted by the brilliant and profound writings of others who serve better the tastes that Burroughs himself stimulated, and satisfied so well in his day.

Such are the circumstances in which we welcome *John Burroughs' America*. From a dozen of Burroughs' works Miss Wiley has made some eight dozen selections (with one added from Clara Barrus' volume *John Burroughs' Boy and Man*) and has arranged these anew into seventeen topical mosaics. These new entities, into which the "best" writings from Burroughs' on "natural history themes" are skillfully combined, are entitled 1 The Philosophy of John Burroughs, 2 Exhilaration of the Trail, 3 Straight Seeing and Thinking, 4 Weathered Rocks, 5 Spring — Nature's Door Ajar, 6 Summer — Nature's Door Wide Open, 7 Autumn — Nature's Invitation to Rest, 8 Winter — Nature's Door Closed, 9 Maple Sugar Days, 10 Flowering Plants, 11 Insect and Amphibian Ways, 12 Bird Study, 13 Bird Song — A Challenge, 14 Birds' Nests, 15 The Ways of Mammals, 16 The Soil in Ferment, and 17 The Sound of Nature.

Miss Wiley has carried out her plan excellently, and her resulting volume has proved good reading consecutively, cover to cover, and also good reading, here and there, later. It does credit both to herself and to John Burroughs.

She has, of course, fared no better than others as a rival of Burroughs in composing titles. Walt Whitman, it seems, suggested *Wake-Robin* (1871). Thereafter Burroughs himself succeeded in writing titles to match this first eloquence, including (to name only those used here by Miss Wiley) *Winter Sunshine* (1875), *Birds and Poets* (1877), *Locusts and Wild Honey* (1879), *Pepacton* (1881), *Signs and Seasons* (1886), *Riverby* (1894), *Ways of Nature* (1905), *Leaf and Tendril* (1908), *Under the Apple-Trees* (1916), and *Field and Study* (1919), and Dr. Barrus tells us that Burroughs had suggested the title for the posthumous volume *Under the Maples* (1921), which also is used in this volume.

Nor has Miss Wiley, in our opinion, been inspired in naming (or agreeing to the naming of) her book, for John Burroughs was both more than a "Hudson River Naturalist" and at the same time an author with a scope hardly described by the name "America." It is not his America we have here, indeed, but his outdoors (almost one might say his world), and he is in his distinction the naturalist, not of the Hudson but of the commonplace as such. Miss Wiley, of course, is well aware of this — notably so when she concludes her appropriate and delightful introduction with the nice admonition: "Let John Burroughs, our poet-naturalist, take you afield and show you the wonders at your very door."

But this beautiful volume and its parts, however named, will certainly please and inform; it is indeed a curious manner of commendation to praise and illuminate the substance of a work by thus cavilling at its titles! (I'm sorry!)

Miss Wiley has performed an editorial task that Burroughs himself might well have done, from time to time, fashioning (as he might have) the more enduring parts of his magazine articles and the records of his journals into something more solid, less discursive, for book purposes. With the aid of the volume's appended list of the sources of the quotations used in the book, it has been a pleasure to compare the original articles with these selections and to note the sure taste with which the selections have been chosen. There is skill, too, in the gathering together of these selections into chapters. Burroughs himself, of course, might have adapted such selections for such use by altering introductory and concluding sentences and even writing anew transition sentences or paragraphs. Miss Wiley, with a scrupulous regard for the validity of her author's text, has been denied this privilege, and her achievement is to be appreciated the more in the light thus of these limitations. It is a real achievement, making a welcome contribution that we shall long appreciate.

Once again — in Miss Wiley's volume — it has been delightful to note the charm for Burroughs of April. Such expressions as "one April day" or "while walking in the woods one April day" repeatedly come

into this text without the necessity of specifying time of year, and no other month seems so delightfully intrusive. One is almost certain that Miss Wiley has been influenced by no April partiality in her selections, but that her text fairly represents Burroughs' own pleasure in the sound and sight of this name. It would be fun once again to assemble the April comments, but this must now be a pleasure for readers themselves, and we shall here conclude with one more emphasis on April's beginnings, reading: "The door of the seasons first stands ajar this month and gives us a peep beyond. The month in which to begin the world, in which to begin your house, in which to begin your courtship, in which to enter upon any new enterprise." April!

* * *

A delightful month also, incidentally, to reenter this "Nature in Print" enterprise! How interesting it was (during the quiet and rather comfortable interim of convalescence from a coronary spasm brought on by the unrelieved tension of too much writing and editing, without enough — oh shame! — of the outdoors preached by that writing and editing!) — how interesting it was to read the pages by Paul H. Oehser and behold his success in the sort of discussion that has been attempted on this page month after month, and even to see in his February contribution that almost impertinent digression in which the reviewer was so charitably reviewed. Certainly one is never so well sustained as by appreciation and this convalescence (still continuing) has indeed been induced and enriched by the love, friendship, and kindness so generously expressed. What a joy it is to contemplate another spring and hail another April!

John Burroughs' America: Selections from the Writings of the Hudson River Naturalist. Edited with an Introduction by Farida A. Wiley. New York: The Devin-Adair Company. 1951. 304 pp. (6 by 8¾ in.), with foreword by Julian Burroughs, frontispiece photograph, 26 drawings by Francis Lee Jaques, list of sources of quotations used in this book, list of books by John Burroughs, and index. \$1.

About the Bees

The Flying Nation. By Dorothy E. Crowder. New York. 1952. Roy Publishers. 156 pages. Illustrated by Helen Haywood. \$2.50.

This is the story of the bees and life in the hive, written for the younger audience, yet not a strictly juvenile book. The author personalizes the apian actors in her story, seeming to have a supreme confidence in her knowledge of what the bees say to one another. Perhaps this is allowable here, but we think her story could as well have been told without such an anthropomorphic device.

Checklist for Naturalists

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for the

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A Naturalist's Adventure in Nepal by DILLON RIPLEY.



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To Attract Birds

Picture Primer of Attracting Birds. By C. Russell Mason. Boston. 1952. Houghton Mifflin Company. 30 pages. Illustrated in color by Bob Hines. \$2.50.

A tremendous amount of valuable material on attracting birds is packed into this "primer" for the host to birds. The illustrations and the text dovetail neatly.

Jordan Bibliography

David Starr Jordan, A Bibliography of His Writings, 1871-1931. Compiled by Alice N. Hays. With an appreciation by Robert E. Swain. Stanford, California. 1952. Stanford University Press. 195 pages. Paper, \$4.00.

David Starr Jordan was known primarily for his great contributions to the knowledge of fishes, and, therefore, as an ichthyologist. This bibliography, however, reveals the breadth of his interests. While 53 pages are devoted to his ichthyological writings, 22 pages list his writings on various subjects in the field of science; 29 pages on international relations, including war, with respect to which Dr. Jordan felt very strongly; 19 pages on the subject of education. The balance of the books and papers are grouped under Generalia, and they further emphasize the versatility of his mind and thinking. Among the listings are articles that appeared in the early days of *Nature Magazine*, and which are an adornment of the issues in which they appeared.

The Bird

The Bird: Its Life and Structure. By Gertrud Hess. Translated from the German by Phyllis Barclay-Smith. New York. 1952. Greenberg. 244 pages. \$4.00.

This book differs from the usual bird books in that it is a general ornithology bringing together authentic information applicable to all species. The chapters deal with bird migration, reproduction, structure and function of the bird's body, classification, ancestry, and extinct and vanishing birds. The text is popular and the translator, a distinguished British bird authority, has rendered it excellently.

Star Manual

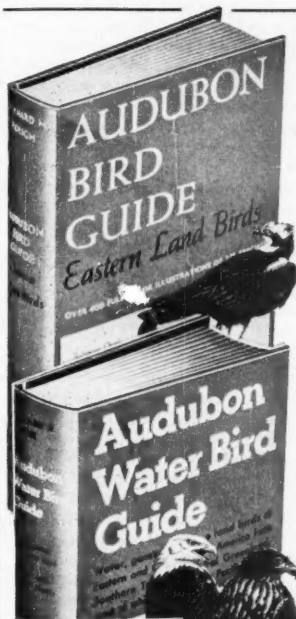
Looking at the Stars. By Carlos S. Mundt. Dubuque, Iowa. 1952. William C. Brown Company. 58 pages, with illustrations and sky maps. \$2.00.

This is an introductory manual for the beginner-observer of the heavens. The author is Professor of Astronomy and Mathematics at San Francisco State College. He recognizes that there are many books for the beginner but has found that a fair share of these are over-technical. Having also encountered this comment from students, he has gradually evolved this little book in an attempt at simplification, which certainly appears to have been successful.

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WRITING THE POPULAR NATURE ARTICLE*

BY JOHN K. TERRES

*Managing Editor,
Audubon Magazine*

FIRST of all, it is important to understand something about editors and their relationships with writers. Many beginning writers believe that editors are heartless and without any sympathy for authors. I say "beginning" because a writer must correspond with editors for a while, as I have done, or meet them personally, to find that editors are not such bad fellows after all. Like baseball umpires, they must call decisions the way they see them, and they seldom, if ever, make decisions based upon prejudice for, or against, a writer.

Almost every editor is on the author's side because the editor is looking for good material and for promising writers upon whom he can depend to give him the kinds of articles he wants for his magazine. Most editors, or their assistants, read every submitted article, eagerly, in the hope that it is something they can use. Usually the editor can tell whether an article is suitable for his magazine after reading the first page. If he rejects it, he may have various reasons for doing so. Perhaps he already has accepted an article on the subject, or he has published one like it too recently to buy another at the time. That is why an editor prefers that the writer query him about the article before the author writes it.

But suppose you have already written your article and the editor has rejected it. This does not always mean that it is poorly written, or is not acceptable elsewhere. Often, the article one editor rejects may be just the one that the editor of another magazine, in the same field, is looking for.

There has been some bitter criticism of editors and their editing, not so much, in my experience, by veteran writers, as by beginners. I would like to dwell for a moment on the editor's relationship to the author's manuscript.

Most of you know that when you walk through a woods, your ground view gives you little idea of its extent or structure. "You can't see the woods for the trees" may be a hackneyed phrase, but it surely fits our situation here. You may have wished at such times, as I often have, that you could soar over the woodland as a bird does, and see the tract as a whole. This

is somewhat the position of the editor when he reads a manuscript for the first time. He is above the forest, or "out of the woods" so to speak, where he is able to see structure without being distracted by individual trees.

When a writer sweats and labors in an agony of creation over an article, it becomes a part of him. He may have rewritten it as many as four times or more to gain greater perfection, but in doing so, the parts of it may no longer make the unit that he visualized in the beginning. He has become "too close" to his product, and, unless he lays the article aside for a few days, he may be unable to appraise it dispassionately before he sends it to the editor.

The editor, reading the article for the first time, can be objective, simply because he has never seen the article before. This is a great advantage in judging not only the suitability of the article for the magazine, but the effectiveness of its presentation.

No editor willingly changes a word, a sentence, or a paragraph unless he thinks his changes will make the article *clearer* to the reader. Neither do editors change the organization of an article, unless the shifting about of paragraphs, or of whole blocks of material, will make the article clearer, stronger and more interesting. My practice is to make as few changes as possible, and *never* to make those that will sacrifice the author's personality or twist his facts about. Changes take an editor's time, and most of us are just too busy to fuss with an accepted article unless it is in real need of editing.

One particular fault in article organization occurs time and again. It is when the author's "lead," or what should be his opening paragraph, is buried deep within the article and needs to be brought up front where it will immediately get the reader's attention. Yet too many manuscripts start with the dry-as-dust, dull happening that is neither relevant to the story, nor of interest to the reader.

Professional writers have many ways of opening a popular article to avoid the flat, uninteresting statement — they may tell a good story, ask a question, or startle the reader with some astonishing fact. The article's lead is probably the most important section of your manuscript. Many successful writers spend more time on leads than on any other part of their articles, for an interesting, well-written opening may mean an acceptance instead of a rejection. Even if the editor accepts the article and it is published, the uninteresting lead may discourage the readership that your subject may well deserve.

Next in importance to the article lead is its organization — the structure, or frame on which it is draped. Smoothly organized articles do not jerk the reader back and forth between widely different subjects, but lead easily from paragraph to paragraph by a series of transitions that make the article progress swiftly, even

though it goes step by step. One of the aids to good organization is to make a rough outline of the article before beginning it, and then saying all you have to say about each point at its appropriate place.

I think that article titles, next to leads and organization, rank high in importance because an eye-catching, descriptive title will favorably influence both the editor and reader.

Last, and appropriately last, your article should have a satisfactory ending. This is never so difficult to write as the lead, or opening, but it should never leave the reader with the feeling that there is more to follow, causing him to turn to the next page in search of it.

There are many "don'ts" to article writing, but there is one in particular that every writer of the popular Nature article should observe. Most of us who are deeply interested in wildlife, and especially in its conservation, have strong feelings about our subjects. When we write about them, we are tempted to wither the opposition with strong language. If you are writing for a general magazine, do not do it. Leave that to the editorial writers. Do not preach, or editorialize your article, for it will show your reader that you are angry, that you have an axe to grind. If you have a strong conservation theme, it is better to make your points subtly, rather than to hit your reader over the head with them, again and again. To do so is to risk antagonizing him and thus losing the very effect upon him that you had planned. It is far better to drive home your theme by that "interesting to the reader," inoffensive technique of using anecdotes about your subject — stories about people, or other illustrations that will lead him inevitably to your own views.

If you have an idea for a Nature article and want an even greater readership than you will get in the nature publications, you may want to try it on *Coronet*, *Colliers*, or some other of the large-circulation, general magazines. For them you must have an article whose subject matter is of almost universal interest and a subject that will have a powerful appeal.

This leads us to markets for wildlife articles. If you are satisfied to write Nature copy for your local newspaper, and this is a very worthy task, you will not need to know so much about its reader interests because you will develop certain followers who will faithfully read everything you write. But if you are planning to do articles for magazines, you should study these publications, read at least several issues of each and learn what kinds of Nature material they use. It would be even more helpful to you to write a brief note to the editor, asking him what kinds of natural history articles he is interested in getting.

I am sure that if you try your hand at popular writing, mix it with persistence and a regard for writing techniques, you will have fun and undreamed of success.

*Part of a talk at the panel discussion, "Publishing a Nature Magazine," American Nature Study Society annual meeting, Hotel Adelphia, Philadelphia, Penna., December 28, 1951.

Contents Noted

MODERN approach to getting the motorist from place to place rapidly, and as safely as possible, calls for the building of divided highways with no direct access or with limited access. These highways are given various names, such as turnpike, thruway, freeway and the like. These are engineered for safety so far as it is possible to do so, which is one reason that access is so strictly controlled, and services along the route carefully regulated. Recent studies have shown that, in killing more than a million people on our highways, a large proportion of the accidents have occurred where the highways are lined with roadside business and advertising. Such a route is Route 1 between Baltimore and Washington, a death-trap and a disgrace, if ever one existed. However, the much-desired safety of the new freeways, built at great expense and often as toll roads, is constantly threatened by the outdoor advertiser. Distraction of the eye and attention from the important business of driving at high speeds is a menace inherent in every signboard, yet in most cases the authorities have failed to guard against this menace in advance. Outdoor advertisers, organized and otherwise, cannot be relied upon to consider the public interest. So they must be kept off the freeway environs by law. The January, 1952, newsletter of the National Roadside Council, 119 East 19th Street, New York 3, New York, points a revealing finger at this problem.

EXTREMELY dangerous precedent is involved in a bill, H.R.5953, introduced in the House of Representatives by Congressman Robert Sikes of Florida. This proposal would open up one-fifth of the Saint Marks Wildlife Refuge in Florida (See *Nature Magazine* for December, 1951, page 523.) to public hunting. This is a betrayal of the public. Under the provisions of the law originally establishing the Federal Migratory Bird Hunting Stamp, or "Duck Stamp," refuges acquired with funds from the sale of the stamp would be inviolate sanctuaries. Saint Marks is such a refuge. When the Act was amended in 1949, and the price of the stamp increased to two dollars, a provision was included authorizing the Secretary of the Interior to open up to public hunting not more than 25 percent of any refuge acquired after 1949. While we did not regard this provision with enthusiasm, there are some points in its favor. But any move to legislate a public hunting ground into a legally inviolate area is to undermine the whole program of wildlife refuge administration.

RECENTLY we received an urgent request for a copy of the December, 1951, issue of *Nature Magazine* from Hon. Henry N. Graven, United States District

Judge for the Northern District of Iowa. The magazine was airmailed to him, although we were somewhat mystified as to the reason for all the rush. Now Judge Graven has been so kind to let us in on the reason. He was confronted with rendering a decision in a civil action involving a property upon which there was a considerable deposit of gypsum. The copy of the magazine contained an article on gypsum, "the rock that nobody knows." So Judge Graven had recourse to the information contained in our article, from which he quotes in his decision. We are happy to have been of aid to the court.

WORTHY of emulation by every State is the action of the State of Wisconsin in creating by law The State Board for the Preservation of Scientific Areas. This Board has now been organized with John T. Curtis of the University of Wisconsin Botany Department as chairman, and C. L. Harrington, Wisconsin's Superintendent of Forests and Parks, as secretary and executive officer. The Board will develop a series of definitions covering areas to be listed as scientific areas. It will canvass recommendations in the past with respect to such areas, and invite the cooperation of experts in respective natural science fields. The Board is not authorized to accept grants of land or money, but will serve as an intermediary between grantors and State departments or other agencies best adapted to manage and develop scientific areas. If every State would take similar steps we might hope that important scientific reservations would be preserved from needless destruction. Once destroyed or seriously impaired such areas can never be restored and their values are lost to posterity.

THE late Harold L. Ickes took special pleasure in calling himself a "curmudgeon," and was a master of the caustic and sarcastic, at times, particularly in his correspondence. This was, we feel, largely a reflection of the depth of his feeling and his integrity, for he brought to public office an honesty and sincerity of conviction that is all too rare. Harold Ickes was a staunch conservationist and under his administration the Department of the Interior took on a stature that it had never had before. Ira N. Gabrielson, president of the Wildlife Management Institute, served as Chief of the U.S. Fish and Wildlife Service under Mr. Ickes, and he says: "During the years that I worked with Harold Ickes, I formed a very high respect for his integrity and his ability and feel keenly his loss, both from a personal standpoint and from that of a fellow worker for conservation." This is a sentiment shared by many conservationists, even though they may have, at times, differed violently with Mr. Ickes. Even a difference with him was a stimulating experience, and he will be widely and greatly missed. R.W.W.



An example of the type of Japanese garden that does not strive for a profusion of distracting colors but for a vari-shaded, monochromatic scheme of swept earth and flat rocks. This "flat" garden is in the grounds of the Hotel Ikaya at Naoetsu.



Many school classes in Japan take to the outdoors for instruction and pleasant surroundings. Here a group does its school art work at the seashore.

Old Nature in A New Japan

By FRANK A. TINKER

A PERSON who spends sufficient time in Japan to become reasonably well acquainted with the country usually comes away remarking on the thorough appreciation by the people of the natural life and beauty of their islands. In some respects, the visitor is entirely correct, in others he may be confused because of an incomplete realization of the part Nature plays in the national character of the Japanese. A closer examination of this unique relationship, which is rarely found in western books, may be of interest, and may lead to a more sympathetic understanding of both factors involved.

In his primary observation of the intimacy between the people and their natural surroundings, the visitor to Japan cannot be mistaken. The captivating evidence of this familiarity is continually before one — in the ubiquitous presence of gardens beside even the most humble homes; in the containers of flowers on the wall of the countryside railway station; in the many little roadside shrines, which seem more like parks; in the meager circumstances that force the inhabitants to live not far removed from the source of their food — or so it would seem. Actually, many of the green *tsubo* — an area measurement of about one-sixth of an acre — which the casual traveler sees, furnish only an inconsequential portion of the family's food needs, and are planted through the inherent pride of the Japanese as a gardener. However, in looking further into the life

of the nation, the deeper and finer connections between its culture and all of Nature are even more striking. In probably no other modern country does the civilization abide in closer or more continuous contact with the raw materials of its existence.

Indeed, the aspect of Nature is so closely aligned with every form of national expression in Japan that the difficulty becomes that of assessing carefully each manifestation and deciding whether or not that particular instance remains a matter of Nature itself, or has become so mated with or amalgamated into another subject that it has lost its own identity. That this is quite possible was obviously considered by General MacArthur when he took over the occupation of that country, since he found that the symbolism of the national flower of honor, the chrysanthemum, was so imbedded in the minds of the populace that it became advisable to forbid the open cultivation and exhibition of the genus.

This is an extreme case, of course, but the fact remains — and the difficulty — that in Japan the highest forms of human expression, art and religion, are almost indistinguishable from an outright Nature adulation. Thus it is necessary that one admit this at the outset, realizing that no definite line can be drawn at which the love of Nature, inspiring the art, becomes a technique of the art itself, or where the awe and wonder at the infinite natural world crystallizes into a formalized

worship of the infinite rather than the appreciation of things at hand.

This is not a new situation in Japan, by any means. At the present, as a matter of record, the Western influence towards an increased materialism has caused the first significant trend away from this regard of Nature in the entire historical catalog of the country.

Gardens, for instance, which for the Japanese are the comparatively intimate means of communion between a man and the *idea of*, or *idealized*, Nature, were known to be in patterned existence in the 6th century, probably having been brought to the islands from the peninsula of Korea, or the Chinese mainland proper. Regardless of their origin, they adopted an immediate, unmistakable Japanese individuality, which has continued to this day.

The Western visitor, upon entering a Japanese garden, usually is moved to comment about the lack of color it contains. Indeed, Japanese philosophers and gardeners themselves have maintained at times that, in the furtherance of the central idea of simplicity, it is best to strive for a vari-shaded, monochromatic scheme, rather than a profusion of distracting colors. Thus

there are seldom flowers, but rather a quiet chiaroscuro, a swept earth, often a single large rock. All this is the paraphernalia of meditation, none of exhibition. This applies equally well to the two main types of gardens. One is the small "cat's forehead" attached to so many homes, inspired by the Zen sect of Buddhism and its theme of spiritual recreation through simple beauty. The other garden type is the larger "strolling" garden in which a path may wind through several scenes of waterfall, bridge, or rock cluster. Such derive from the Higashiyama period beginning in the 15th century and reaching its zenith with the Edo period of the Tokugawa reign in the late 17th century.

These latter gardens usually are found on the former estates of Japanese *daimyos*, or noble families, and many are preserved today in essentially the same style and condition as when they were first laid out. Among these are the Ginka-kuji (Silver Pavilion) and Kinka-kuji (Gold Pavilion) at Kyoto, excellent examples of the effective use of simplicity in design. However, the main point in considering this extensive cultivation of gardens is that they are all, without exception, highly formalized. The same is true of the Japanese approach to Nature itself.

Two aspects of this formalism can be mentioned here, one an impersonal, generalized observation, and the other being taken from the writer's intimate experiences in Japan. The first concerns flower arrangement in that country. This is so highly developed that it can be called an art, since it has become a means of social expression rather than just a vehicle for the advantageous display of the blossoms themselves. There are literally hundreds of rigidly ordained designs that the skilled flower arranger must know, each dealing specifically with a particular incident or expression. There are such designs as that signifying an entreaty for rain, or gratitude for the birth of a son. These may take on additional meanings through the circumstances of their use, also. They may involve the use of only a few maple leaves on a twig, a shoot of bamboo, or some plum blossoms, since the aim is to recreate the idea's beauty with as little material as possible, but the very angle of each component in this arrangement is significant and studied.

In the spring of 1944, when the weather first permitted an early morning outing, the war prisoners in the camp at Ofuna, which included the writer, observed the aged commandant of the camp commence a ritual that varied only minutely during the period of our stay there. Precisely ten minutes after the morning *tenko*,

With even the most humble Japanese homes there is some touch of beauty and reverence for Nature.



The Japanese are justly proud of the quiet beauty of their islands.

or inspection, the old warrant officer would proceed from his office slowly along the small rock pathway to a benched bower standing near the gate. Taking up a position with his hands behind him, gazing out over the barley fields and rice paddies that patterned the valley, he would remain there, involved in this apparent meditation on the trees, the occasional bird, and the condition of the morning for nearly a half-hour, although we had long before learned through many sources that he personally cared very little for any part of it and was only waiting for his tea to be brought. During the wait, he was taking the occasion to impress the Japanese members of his staff that he was thoroughly indoctrinated with the idea of gentlemanliness among officers, which included a frequent meditation on the Japanese earth!

Later in the spring when the *sakura* — flowering cherry — tree spread a parasol of the most delicate color over his retreat, the period of meditation lengthened to an hour, although its effect was frequently lost when the old gentleman fell asleep over his tea.

Statistically, it is not surprising that the Japanese should show such a preoccupation with the furnishings of Nature. Figures show that at least 60 percent of the population is engaged in agriculture as a means of livelihood while, as it has been pointed out, many more cultivate gardens and even fields for additional income, or from a simple love of the land. This is not the mechanized farming of the West, of course, but done for the most part with the simple hand tools used throughout the Orient. Through this concern with the intensive cultivation of even a small plot, the Japanese acquire an early familiarity with the seasons, the ways of plants, and the general conduct of Nature.

Until very recently, the failure of a rice crop in one of the few fields a family owned meant literal starvation for that family, since there was little storage of grain and no surplus with which to repay loans on future crops. Traveling through the countryside near our house in Japan during the autumn of 1951, we would frequently see fields that, the day before, had been piled with sunning barley, now being dug and planted with a winter crop. Japanese fields never rest. During



the war the people and prisoners alike lived entire winters on *kao-liang*, a millet, and dried ferns mixed with a little soya-bean paste.

This forced intimacy with Nature as a source of life prompts much of the association in other respects. It is only natural that a person in such a circumstance should turn to his closest benefactor for an object of worship, and to the source of his deepest satisfaction as a foundation for a national art. Thus, in each home, the *kakemono*, a small niche in which is hung a scroll or other simple ornamentation of semi-religious significance, is usually graced with an offering of a flower or some small produce. Also, every Japanese painter of note, until recently, has gained distinction through his reproductions or interpretations of natural life.

In this latter instance one finds the most significant indication that, perhaps, in the formalism of the Japanese approach to Nature the appreciation of Nature itself may have been by-passed. For when a Suzuki or an Ogawa paint a bird in flight, or a tree at evening, what arrives on the canvas is, traditionally, the idea or the philosophical content of that subject, rather than an emotionally sympathetic portrayal. This has its corollary in an interesting paradox. With all the seeming preoccupation with natural things, the Nipponese show little consideration for animals, or, actually for plants. It has long been a mistaken belief that, in

In the hill gardens above Ome a young man looks meditatively out over the sun-misted valley.

Japan, the farmer was kind to his steer, the boy to his pets. Yet an indifference to any kind of animal suffering is the rule throughout the Orient, Japan not excepted, and during the war soldiers of the Rising Sun would gleefully use stray dogs for bayonet practice.

Since the elimination of the military regime and the renunciation of war, little change has been noticed in this regard. It is the rule rather than the exception that when an animal is struck down in the streets by a passing car an amused crowd gathers to watch its dying. Many persons who have spent their time in Japan on carefully guided tours, or have lived in the metropolitan districts, will dispute this, since it is not a popular fact with a Japan struggling to adopt Western standards of conduct, but it is egregiously true nevertheless.

With flora, one of the remarkable achievements of the horticulturists (and it is emphasized again that there is an extremely close connection between these forms of endeavor and the art or philosophy of Japan) is the dwarfed tree, exceptional instances developing in which the plant may be one hundred years old, yet, through a carefully calculated program of stricture and starvation, has reached a growth of no more than a foot and a half. It appears that this is an unnatural and essentially unsympathetic approach to the subject, since the natural condition of life is growth. This is actually one of the tenets implicit in Shintoism, so it becomes doubly significant.

It is not necessary here to become involved in a long description of Shinto, Way of the Gods — the main and until recently the State religion of Japan. Suffice it to say that the main principles of its philosophy are a belief in the divinity of Nature-life and its indestructibility, mixed with a complicated, again highly formalized, ancestral worship. The point with which we are most concerned is that in this instance, as well as those we have noted before, the regard of Nature is regimented, ordained, and quite limited in its intent.

A mention was made earlier of the change which appears incipient in the Japanese relationship with Nature, due to the association with the West. Lest this appear a futile plea for the reformation of Japan's spiritual life along American lines, it should be stated here that there seems little reason why the increasingly open regard of Nature cannot exist compatibly with the present and traditional Japanese way of life. In that country, as in this, the people are having to find new meanings and promise in their national institutions, whether they be religions, social programs, or individual outlooks. That they have so enthusiastically chosen the American as a model is flattering and certainly not



disastrous to the Japanese' own culture. As in other hemispheres, the native culture has evolved through centuries with the unconscious purpose of reconciling the person with his environment. As such, it has a sturdy and legitimate background. In the same regard, it will support easily the suitable contributions from other cultures.

For instance, there is no seeming conflict in a freer association with Nature throughout Japanese life. Rather than be circumscribed by tradition, many of these energetic people have chosen to consider their relationship with Nature as an entirely personal, rather than institutionalized, affair. That this may become general throughout the country is one of the possibilities inherent in the Orient's closer rapprochement with the West.

Today, in Japan, scarcely a train leaves Ueno station, Tokyo's Grand Central, that does not carry a hiking party bound for the central mountains or a school Nature-study group out on an assignment. Immediately following each holiday, the incoming cars are filled with family groups, including wives and children, sturdily attired in walking clothes, perhaps carrying a set of the excellent, cheap, Japanese binoculars. Returning from the most inexpensive, yet rewarding vacations possible — a day or two wandering in the forested hills of their homeland — they appear indistinguishable from the similar groups debarking from Bear Mountain or Yosemite.

Last summer, on the long, gray beach at Naoetsu, along the inland sea, there were parties of school children seated overlooking the surf, drawing for their school lessons — a frequent method of teaching in Japanese schools. In the hill gardens (Continued on page 218)

Listen to the Mocking- Bird

By LEWIS NORDYKE

"The mockingbird is a saucy little rebel dear to the hearts of millions . . . with his own lilting song and pert personality, he has inspired five State legislatures to listen and then stand up and vote for him."



THE mockingbird is a saucy little rebel dear to the hearts of millions — even to millions who have not heard his trilling in the top of a blossoming magnolia. Poetry and song have made the bird famous far out of his widening range. But, with his own lilting song and pert personality, he has inspired five State legislatures to listen and then stand up and vote for him. He is the State Bird of Arkansas, Florida, Mississippi, Tennessee and Texas, and the National Audubon Society calls him America's National Songbird.

Great poets immortalized the nightingale and the skylark, but a Negro barber in Philadelphia captured the melody of the mockingbird and brought it down to the heartbeat level of sentimental folklore. His "Listen to the Mockingbird" has been a favorite of every American generation for 97 years, and perhaps is the most famous song ever written about a bird. In a nostalgic, lonely-soul way it reminds one of the songs of Stephen Foster.

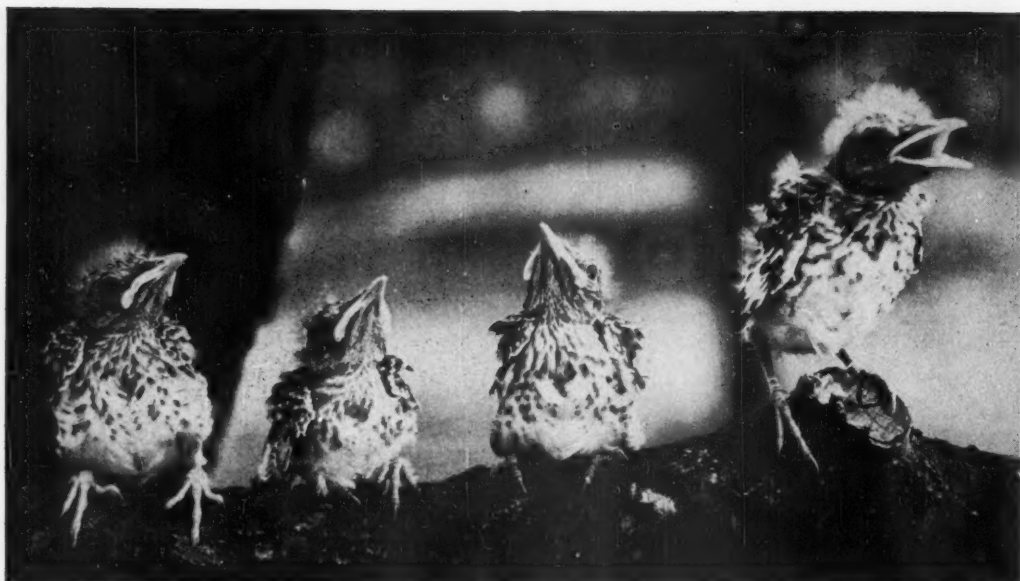
Richard Milburn, a natural-born whistler who accompanied himself with gifted strumming on the guitar, first whistled the tune in his father's barbershop on Lombard Street in Philadelphia just a century ago. The customers loved it. One day Septimus Winner, a composer, heard Milburn whistle the melody, including some trills of the bird's own song. Winner wrote the words — the poignant story of a man who has lost his

love and hears the mockingbird singing over her grave. He had the song published in 1855 under the title, "Sentimental Ethiopian Ballad — Listen to the Mockingbird." The copyright credited Milburn with the melody.

All of which probably makes no difference to the mockingbird. He is mainly a resident of Dixie, but he sings from Mexico and the West Indies north to mid-California, southern Wyoming, Nebraska, Illinois, Ohio and Maryland. In recent years, he has infiltrated new territory and now is heard occasionally in the Great Lakes region and in New England. A slightly larger form, known as the western mockingbird, ranges from Oklahoma and Texas westward to California and southward into Mexico. It has the same characteristics as its eastern brother.

Mockingbirds do not migrate with the seasons. They are the stay-at-home type with little gypsy blood. However, the singers that live in village and city do fly away in the late fall to spend the winter in the surrounding countryside, where there is a more stable supply of food.

The mockingbird is an opera singer without a fancy costume. He is not blessed with fine feathers, brilliant colors or plumed topknot. He is a slim, gray bird the size of a robin, with black diamond eyes and a long, sharp beak. Patches of white in the wings and tail



A study in varied personality. Four young mockingbirds, all in a row, appear to express a wide variety of sentiments. We might say surprise, doubt, smug disdain and belligerence. You pick yours.

show when the bird is in flight, giving dash and sleekness to his lines.

The sober-suited songster, conspicuous on the loftiest perch — tree, pole or power line — can open his throat and mimic the songs of forty other birds in a ten-minute concert. But the mockers are nonconformists; some of them mimic and some of them stick strictly to their own songs. This has given rise to argument among naturalists: Is the bird actually a mimic or a singer born with a marvelous repertoire? The average bird-lover, who can not pronounce *Mimus polyglottos* or *M. polyglottos leucopterus* (the scientific names of the two races of our mockingbird) can listen to the mock-inbird and imagine he hears most of the bird songs of his life. People who love the gifted mimic say he "can mock anything," including the squeak of a wheel or well pulley, or the whistle of a youth who has just beheld loveliness across the way.

Some years back, several English nightingales were sent to Lake Wales, Florida. Although caged, they burst out in frequent song. One night there was great consternation. Nightingale music was filling the air, coming from the treetops up and down the countryside. But the nightingales had not escaped. Mockingbirds had picked up the imported music and were improving on it.

Choctaw Indian lore has it that the mockingbird sings in a foreign language and that his trilling sounds are of the Happy Hunting Ground. In Mexico there is a legend that the gay, extravagant songster, impressed with his own brilliance, decided he was lord of the sky and of song. He was flung to the ground in rebuke.

Since that time of chastisement, his song has commenced with *Con el favor de Dios* — If God wills it. On a bright spring morning, when you hear the first clear sound of mockingbird music you can, with some auditory imagination, discern this phrase of submission to a higher power.

Except for the hermit thrush, known sometimes as the American nightingale, the mockingbird has the sweetest, most musical voice of any feathered songster, and certainly he has the greatest range and variety of song. Sharing honors with him as singing mimics are a couple of cousins, the catbird and the brown thrasher. The catbird brims with mischief and has a great reputation for playing the strutting dude and the low-life tramp in both appearance and singing; he can sound off with glorious song and then utter the harsh squawks and catcalls that gave him his name. The catbird, sometimes known as the black-capped thrush, is smaller than the mockingbird, but there is a family resemblance.

In its wide repertoire of song and mimicry, the catbird sounds each note or phrase only one time; the brown thrasher does each note twice, but the mockingbird, cocksure that his stuff is worth repeating, trills each note or phrase at least six times; this gives his song a musical fullness and symphonic lilt that no other bird can equal. And he sings more frequently than any other bird.

The male and female are so much alike that many naked-eye naturalists can not distinguish between them, except by observing them at their chores. The male does the singing, and his fecund variety of song is a main part of his courtship, mating and raising a family.

The mockingbird has been chosen the State Bird of five States — Arkansas, Florida, Mississippi, Tennessee and Texas.

He makes it a joyous occasion.

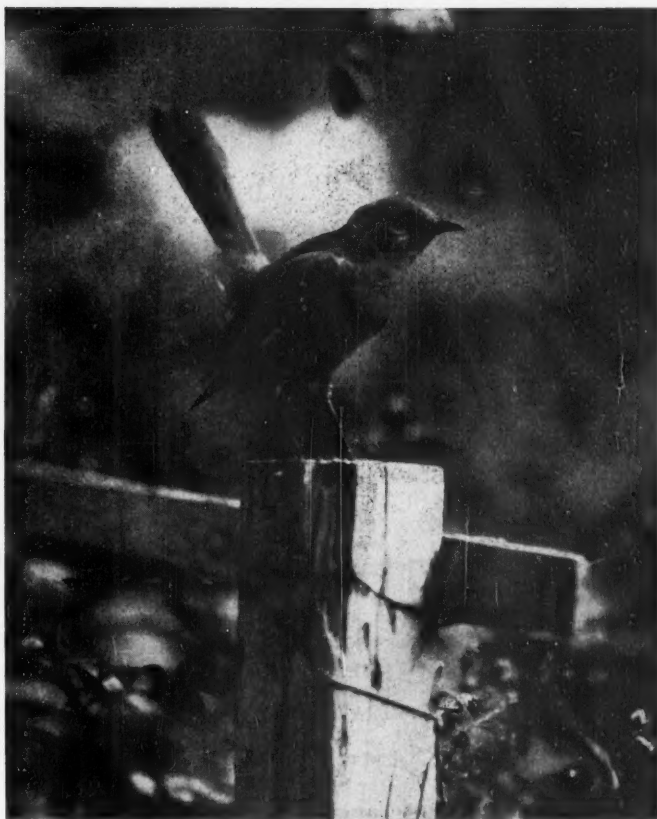
Early in the spring the singer selects his individual territory, which includes a perch from which he can oversee his empire. From here he opens the season with tentative notes, like a violinist tuning up. Within a few days he is in top trilling form, and there is a female flitting about a honeysuckle or the lower branches of a tree; then, as Longfellow said in *Evangeline*, there comes "from his little throat such floods of delirious music that the whole air and the woods and the waves seem silent to listen."

If events do not develop as rapidly as he desires, he resorts to persuasive suggestion, approaching the coy female with a twig in his beak; on the third or fourth such attempt the female takes the hint and the twig, and the loosely constructed nest is built — never in the top of tree or vine, but about midway, so that all approaches can be watched from the nest and from the perch.

During the time it takes the dutiful female to lay four to six turquoise-colored, brown-flecked eggs, the male spends the greater part of his time nearby on the perch, pouring out music. Occasionally he pitches high into the air, turns half a dozen flip-flops and pirouettes back to the perch without missing a note. He works overtime, braving the scorching sun of midday to sing, and keeping his trilling concerts going on moonlit nights. Up and down the streets and alleys of village and town, along country lanes and around rural homesteads the treetop concerts fill the air.

The young hatch within two weeks. They are thinly feathered, awkward things, seemingly two thirds mouth; they stretch their long necks, beaks open, and emit sounds fully as unmusical as Cousin Catbird at his worst.

The father joins in the task of filling the gaping young beaks with worms, bugs, beetles, and berries. But between paternal chores he sounds off on the perch. At this stage of the operatic performance he occasionally skims majestically to the ground, landing with wings slightly up. He runs a few yards, stops and raises his wings another notch; then runs, stops and lifts his wings still higher. He keeps at this until he has covered ten to fifteen yards. In this prance he looks something like a light airplane bouncing along a runway after a landing. Prosaic-minded scientists say he does this to



scare up insects to take home to his ever-hungry brood, but the stunt seems more like the strutting of a proud young papa.

While the young are in the nest, the perch has the advantageous use of watch tower. Any bird or mammal that approaches the nest can expect sudden attack. Last spring a Texas woman telephoned her local newspaper and reported that a large brindle cat had strolled to a position under a nest in which hungry young mockingbirds were squawking. Screaming like half a dozen mad jays, the singer plummeted off his perch and hit the cat behind the ears, making the fur fly and bringing blood. The bird soared to a tree limb, turned, screamed and dive-bombed again. He rose to the eaves of a nearby garage. Using this as one vantage point and the limb as another, he bombed, coming and going until the confused and completely frightened cat scattered.

There is a fine story of Audubon's interest in the mockingbird's courage and ability to fight. While in Louisiana during his early days of painting birds in their natural haunts, he produced a canvas showing three mockingbirds attacking a rattlesnake that had taken refuge in the fork of a tree. In reality, three mockingbirds do not attack a serpent. In his fighting, as in everything else, the (Continued on page 220)

Nevada's Jeweled Cavern

By NELL MURBARGER

AS ABSOLAM Lehman, Nevada pioneer, drove his heavy logging team across the pine-clad flank of Mount Wheeler one morning, seventy years ago, he little supposed that only a few inches of earth separated him from one of the most spectacular caverns in the western United States.

Knowledge of the cave's existence came to him precipitately when one of the horses stepped on a section of the rock ceiling that was too thin to bear his additional weight, and the animal crashed through into the glistening fairyland beneath.

Lehman and several adventurous neighbors later explored a number of the more accessible passages. While the flickering candles, which provided their only means of illumination, made scarcely any impression on the midnight blackness within, the men could glimpse enough to know that they were traversing a grotto of breathtaking beauty.

Advancing between Gargantuan stalagmites and high, fluted stone columns, the exploring party found its way into great underground chambers banked with white terraces, studded with stalactites and hung with delicately-folded stone draperies. The roof of the passageway occasionally dropped so low that they were forced to creep on hands and knees; at other points the high, vaulted ceiling disappeared in the darkness above.

Word of the remarkable discovery soon spread to surrounding towns. In those days, however, few strangers found their way into this remote section of eastern Nevada, and except for residents of that immediate vicinity, the cave remained virtually unknown for half a century.

With eventual realization that here lay one of the major scenic attractions of the West, the area was set aside in 1922 as Lehman Caves National Monument under National Park Service administration.

Since its acquisition by the Department of the Interior, additional passageways in the cave have been opened to head-height, a \$15,000 indirect lighting system installed, trails built, and a campground established. Yet, even today, the place remains little known to the traveling public.

Exploring through the winding corridors by park



While smaller in extent and stature, formations in Nevada's Lehman cave rival in beauty those of famed Carlsbad Caverns. Maintained by the National Park Service, the cave is open to the public.

rangers, Lehman's visitors follow an enchanting trail routed to include all the more interesting groups of formations. Many bear significant names. Situated in close proximity are the Pearly Gates and Angel Wings, while a stone Moses in robes of flowing white stands contemplatively at the threshold of the Promised Land. The leaning Tower of Pisa is represented, and the Tower of London. Several of the main rooms have been given expressive titles, such as the Grand Palace, Gothic Palace, the Queen's Room, the Lodge Room, and similar names.

By reason of their composition, all formations within the cave resound musically when tapped with a coin or other metal object. Tones produced in the Music Room, in particular, are as clear and resonant as those of a pipe organ. Additional beauty is given the cavern by numerous pools of crystal clear water in which overhanging stalactites are mirrored in glistening white, their surfaces seemingly frosted.

That Lehman cave is still largely unexplored is evidenced by many intriguing but forbidden passages that lead away from the main trail, and it is believed that full exploration may disclose here a series of caverns exceeding in size even those of world-famed Carlsbad.



PHOTOGRAPH BY JOSEF MUENCH

A white-barked pine on the foreground against a background of Crater Mountain in Kings Canyon National Park in California.

Whitebark Pine

By DONALD CULROSS PEATTIE

PERHAPS the easiest place to see this alpine pine, without roping any cliffs or setting your heart to pounding, is from the highway that loops around the perfect, snow-capped, volcanic peak of Mount Hood, in Oregon. For it occurs as low as 3800 feet above sea level at Government Camp, and, in even better style, in a protected cove near Cloud Cap, at 6000 feet. Here this tree reaches its modest maximum of fifty feet in height, with a trunk eighteen to twenty inches thick. The branches, which in youth leave the trunk at right angles, become ultimately uplifted to form a bushy crown. And there is then something quite aspen-like about the tree, at least when seen in the distance, in those uplifted, limber boughs, in the thick, fluent tufts of foliage, and, most of all, in the whiteness and smoothness of the bark and the way that the trunks are apt to be a little crooked (quite unorthodox, that, for a pine).

Often several trunks spring up near together and lean slightly outward from each other, to form a slim, plummy grove.

There are two other pines, the limber and the bristlecone, that have whitish bark *in youth*, but with age it turns brown and grows scaly and furrowed. On the contrary, the young twigs of the whitebark are purplish; then they and the trunk turn white *with age*. The bases of very old trunks may become somewhat brown and scaly, and as the scales grow apart they reveal the reddish inner bark but, dominantly, the white bark shines through the forest in a way to make identification certain at a glance. This is a feature so striking in a pine that one can hardly believe at first that it is natural. One feels as though the trees must have been decorticated by fire or beetle. But a close view, a touch of the hand on the bole, will show that this bark, firm and

satiny and gleaming as flesh, is as fresh and natural as that of any paper birch.

At first, as one ascends any of the Canadian and Montana Rockies, or the Cascades of Washington and Oregon, the whitebark is found in the company of western white and lodgepole pines, alpine larch, alpine fir, alpine hemlock, and Engelmann spruce. In its ascent it drops them behind one by one, for of all the trees in its range it is the most completely alpine. And at last it stands, or rather creeps and struggles, alone, rooted in desolate mountain rocks, its limbs on the windward (western) side dismantled, its stem foreshortened to a height of three or four feet, its limber branches so intertwined that you can walk upon them. There is little white bark to be seen on such a timberline specimen and, as John Muir says, the tree seems to have been stopped in its growth by a low ceiling. Although invisible, this ceiling is real. It is determined by the shrieking gales — winds of the very planet's turning — and by the storms of sand; by the crushing load of ice and snow, which at high altitudes sometimes lasts nine months in the year.

"During stormy nights," Muir wrote, "I have often camped snugly beneath the interlacing arches of this little pine. The needles, which have accumulated for centuries, make fine beds, a fact well known to other mountaineers, such as deer and wild sheep, who paw out oval hollows and lie beneath the larger trees in safe and comfortable concealment."

Muir undertook to establish the age of some of these

alpine trees. One specimen had 255 annual rings, although only three feet high, and another of the same height had 426. Yet its branches were still so supple with youth that he could tie them into knots.

As soon as the snow melts, which is not until the middle of July in alpine situations, the whitebark pine begins to flower, the male catkins bright rose-purple and very gay for such a hard-bitten creature, the female catkins or conelets with bright scarlet scales. The young cones grow but little for the first year after pollination and stand erect the first winter; in the second summer they become horizontal and grow rapidly for a few weeks until ripe, in August. They are then chocolate brown and borne in rigid clusters half hidden down in the brush of stout, clustered needles. The scales are thick and seem glued together as if they would never open. Not until the cones dry out in autumn will the pearly seeds escape. Although they have wings when in the cone, these remain attached to the cone scales. Ineptly, then, the seeds merely fall to the ground below.

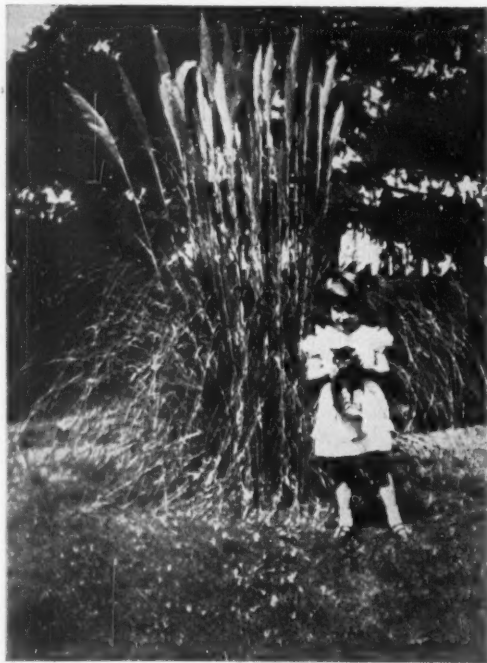
This would seem a poor method of distribution, but there is at hand a vicarious one. For hosts of Clark nutcrackers come every year, with their harsh, rolling cries of *churrrrrr, churrrrrr*. With mighty beaks these gray crows thresh open the green cones and extract the seeds. Indeed, most of the crop falls victim to these pine-loving birds, but enough are wastefully flung around, or perhaps voided without killing the embryo, to spread the species across the gulfs that separate its alpine groves.

Pampasgrass

By H. SEYMOUR FOWLER

SOUTHWESTERN Oregon has, because of its unique geographical location, a varied flora. One of the common and interesting ornamental plants of the region is Pampasgrass, *Cortaderia selloana*. Ornaments make for an interesting diversion from what is native or common. This plant towers over almost all it surveys. Along the margin of its leaves grow spines as sharp as bayonets. Rubbed in the wrong direction, they can inflict a knife-like wound.

Growing in clumps, this plant reminds one of its native habitat, the Pampas. One can imagine the sweeping plain covered sparsely with clumps of this grass, the herds of beef cattle, and the Gauchos. The plumes, or panicles, of Pampasgrass tower above its blades or leaves. Their fluffy, almost silky, bushy tops give a swishing sound when caught in a brisk breeze, bowing slightly to the force of the wind. After a heavy rain each plume has the appearance of a well-drenched chicken. The plumes are often utilized in florist shops in making dry bouquets.



Genetics at Bar Harbor

By HOPE SATTERTHWAITE JEX

WHAT makes us tick? Why are some people prone to cancer, tuberculosis, rheumatic fever, while others manage to by-pass these very real perils? How can we account for, on one hand, the aggressive bully and, on the other, the limply meek? Do the trick of success and the habit of failure alike depend on inborn qualities, or are they the result of fortuitous circumstance? Is the good mixer born, not made? Likewise the painfully shy?

More and more, scientists are turning to the world of animals other than man to find the answers to these questions. More and more, scientists realize that in genetics, the study of heredity, may lie the key to many problems.

Genetics being the study of succeeding generations, no scientist, were he a Methuselah, could possibly live long enough to trace completely the inheritance of succeeding generations of his own kind. The most he could hope for would be an incomplete record from his grandparents' later years to, with rare good luck, the earliest days of his great grandchildren, a matter of merely six generations. Other animals, however, have shorter life-spans, mature more quickly and produce offspring at more frequent intervals. So, by turning to them, it is possible to obtain an inheritance record that, in the human race, would amount to thousands of years.

Besides, what human family would allow the careful check of tendencies and reactions that the laboratory animal, living under controlled conditions, unwittingly affords? Thus we have a growing interest in genetics laboratories.

And, of the many such institutions now springing into being, perhaps the best known and the most highly regarded, in the tight little world of science, is the Roscoe B. Jackson Memorial Laboratory at Bar Harbor, Maine.

To most people Bar Harbor is synonymous with wealth and "high society." In the midst of a city heat wave we read enviously of the large estates, the breeze-swept shores and the lucky ones who people them. But too many of us are totally ignorant of the fact that at this fabulous summer playground may be found one of the world's most important centers of genetic studies.



Five breeds of dogs chiefly used for study of genetic differences in social behavior. Dr. J. P. Scott, Chairman Division of Behavior Studies, on left, holding wire-haired fox terrier and cocker spaniel. Mr. Frank Clark, Technical Assistant, on right holding beagle, basenji, Shetland sheep dog.

The work of this center is far removed from casual resort spirit. The nip of the autumn wind may drive pleasure-seekers home. But the Roscoe B. Jackson Memorial Laboratory continues its studies through the round of the changing seasons.

The Laboratory points with understandable pride to its mouse colony. These mice are perhaps the most famous in the world. Some 150,000 of them are sent every year to major laboratories, both here and abroad. The fifty-odd varieties include the oldest inbred strains ever recorded, some of them reaching 225 generations. A human generation being regarded as thirty-three years, the roots of such a family tree in the human race would push back to a date earlier than 5000 B.C. Small wonder that, genetically speaking, more can be learned from mice than from men! And this record is not a mere listing of ancestors, like the pedigree of a dog or the genealogical tables of the Old Testament. It entails trained and careful observation of qualities, tendencies, individual variations.

Through controlled breeding, the Bar Harbor scientists have developed from the original rootstock certain world-famous, unique, inbred strains, each of which has been so "purified" that it produces exactly similar creatures, like dozens and dozens of identical twins.



PHOTOGRAPH FROM CORTHELL STUDIO

A student at the Bar Harbor laboratory holds one of the rabbits that serve in the genetics studies.

Some of these mice are as hairless as a bald pate; others, even by mouse standards, are mere pygmies; some "waltz" as continually as a dancing dervish; still others are mouse versions of "Barnum's fat woman." Varied colors and color patterns are found among the colony. And each pattern, each color, each distinctive trait, is handed down unerringly to succeeding generations in these carefully selected and segregated strains.

In their search for the causes of cancer, and for the development of effective weapons with which to combat its ravages upon the human race, scientists have long been concerned with the possible role played by inheritance. For the laborious task of checking on hereditary tendencies, these mice of standardized and predictable strains prove a godsend to the investigators. Except for extremely rare instances of mutation, that sudden and little understood change of biological type, which occurs in isolated cases and at infrequent intervals among all animals, whether their breeding be controlled or the result of natural selection, the mice breed true, each strain according to its type. From the standpoint of inheritance, their past is an open book and their future as easily read as a crystal gazer's most roseate illusion. The availability of such highly standardized stock saves the investigators a great deal of time, and minimizes the possibility of error and con-

fusion. Effort need not be wasted in tracing inherited background; the background has already been established through hundreds of preceding generations. Attention may be devoted exclusively to the problem in hand — cancer, its probable causes and its long-sought cure.

Cancer research, however, is not the only field in which these mice have proved their worth. They are in equal demand for studies of pneumonia, influenza, tuberculosis, polio, yellow fever, rabies and even mental diseases. Nor are mice the only animals from which the Laboratory has gained scientific fame. A colony of inbred guinea pigs has been developed and is steadily growing in value to investigators in many fields of science. Further, the Laboratory's colony of approximately one thousand rabbits represents the greatest variety of known races ever assembled in one laboratory. The forebears of the present colony were originally obtained from the laboratory of Professor Emeritus W. E. Castle, pioneer mammalian geneticist of Harvard University. After further development at Brown University, these strains were moved to Bar Harbor. They include every genetic type of rabbit known in the United States, ranging from Polish rabbits weighing two pounds at maturity to Flemish giants weighing twenty pounds. Among the colony may be found blue-eyed white rabbits; furless, wirehaired and satin-coated rabbits; sandy colored, blue, sooty-yellow and spotted

rabbits; rabbits with short, crooked legs, and rabbits whose extreme aggressiveness belies the customary timidity of these usually docile little creatures. Each strain represents an inbred and genetically pure race. Available to other laboratories, these races have proved of primary importance in studies of rheumatic fever, tuberculosis, cancer and other diseases.

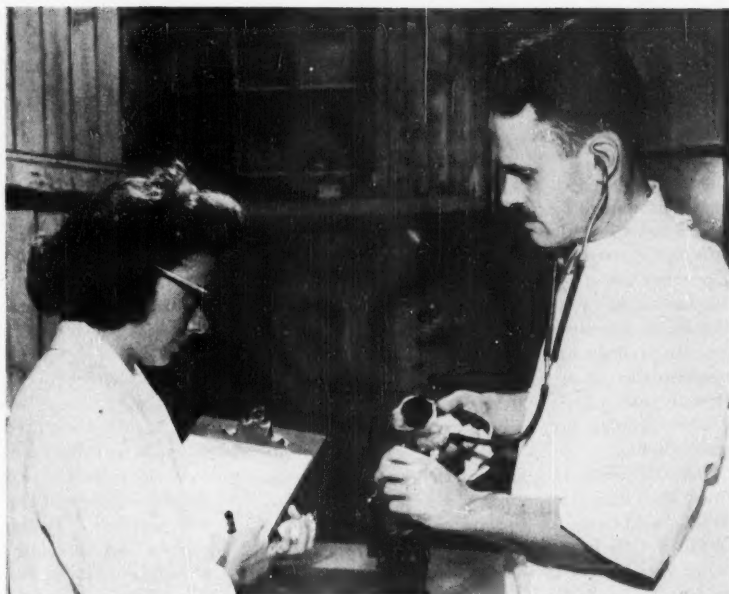
But the Jackson Laboratory is not concerned solely with the production of standardized strains of animals for medical research. It also takes a vital interest in the interplay of heredity and environment in the reactions of both individuals and groups to various social situations.

Conscience, said Darwin, is habit. And a lot of other things may be habit, too, including courtesy, rudeness, temper, and running when we see a bear, which last act, according to William James, is the cause rather than the result of fear.

As with the individual, so with society. The pattern of its functioning is no more than the sum total of its collective habits. Confronted with new situations, any society, like any individual, may produce startling and unpredictable reactions. Yet even then the tendency is to run true to form.

These conclusions are not new. They are, however, but a scratch on the surface of the problem as to what

Dr. Scott tests a new-born, black and white cocker spaniel's sense of smell. Margaret Charles, assistant, records the puppy's reaction, which is of obvious distaste, showing that dogs can smell from birth. They cannot hear for about three weeks, however, and no learning seems to take place during this period.



makes us tick, both individually and *en masse* — a problem of growing moment, considering the condition of the world today. And the basic question still challenges scientist and sociologist: Do the foundations of the habit pattern rest on inherited tendency or on chance environment?

Comprehensive and accurate study of mankind's reaction to given situations is, for obvious reasons, difficult. But, as in the case of medical research, scientists have found that, by turning their attention to groups of animals other than man, they may arrive at conclusions that are applicable to the human race itself.

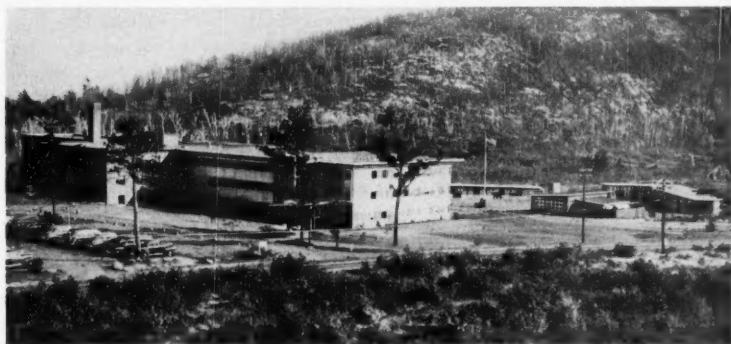
In a vast, yet detailed, enterprise already well under way for the study of heredity and social behavior in animals, the Jackson Laboratory bears the distinction of having developed the first large-scale, long-range research program of this kind ever attempted. Established seven years ago through grant from the Rockefeller Foundation, this project has already produced results of interest to both geneticist and sociologist.

In financing this undertaking, the Foundation felt that a comprehensive study of heredity and social behavior in animals might provide a better understanding of the relationship between heredity and human welfare and thus lead to the solution of some of our social prob-

lems. The program deals with such qualities as intelligence, aggressiveness, and expression of emotions. Through careful checking of inherited background, early environment, immediate situation and individual reaction, the scientists of the Jackson Laboratory hope to provide clues to the important questions as to why people fight, commit crimes, persecute, hate, fear, lead, follow, or have nervous breakdowns.

Headquarters of the program are at Hamilton Station, a tract of land of some fifty-eight acres about seven miles northwest of Bar Harbor. The station was originally a model horse and poultry farm, and donated to the Laboratory by Mr. and Mrs. William P. Hamilton, its former owners. That the project is as far-sighted as it is serious may be deduced from the fact that the first two years were given over almost exclusively to remodeling the huge farm buildings into animal houses and laboratories, and to gathering the necessary animal stocks and equipment.

Dogs have been used in much of the primary work. Several reasons led to their choice. Especially in the patterns of their social behavior, dogs parallel human beings rather closely in many mental and emotional qualities. Also, except for man, dogs seem to show a wider range in basic



The main building of the Roscoe B. Jackson Memorial Laboratory at Bar Harbor, Maine.

behavior patterns than any other species. As the relationship between man and dog resembles that between parent and child, these creatures offer scientists the opportunity to test the basic theories of education and family environment as a cause of abnormal behavior. Thanks to professional dog breeding, the scientists find readily at hand scores of purebred varieties differing from each other not only in coat and color, size and shape, but in mental and emotional traits. The American Kennel Club, for example, recognizes 111 breeds. Thus the investigators find their groundwork already done; they can start their genetic experiments without first having to produce uniform strains through generations of selective breeding. Finally, as a pair of dogs can produce a fairly high number of offspring in a comparatively short time, comparisons can be made, without years of waiting, between dogs with similar heredity brought up in the same or vastly differing environments.

Some 150 adult dogs are kenneled at Hamilton Station. They range from that race of giants, the great Danes, to Chihuahuas, the pygmies of the dog world. Certain breeds have been chosen for the primary behavior studies, and these dogs are housed in the main building of the Station, purebred females being given large, sunny "nurseries" in which to whelp and raise their pups. The varieties selected for these initial studies include cocker spaniels, wirehaired fox terriers, Scottish terriers, beagles, Shetland sheepdogs and basenjis, the so-called barkless dogs from Africa.

As each litter is born it receives as careful attention as the Dionne quintuplets. Every day, from birth to full growth, the puppies are observed, handled and tested. Their great value to the world of science makes it essential that their care should, as nearly as possible, approach the ideal. They are housed, fed, and protected against disease by the most modern methods. They see only people experienced in their care and interested in their welfare, for kind treatment is the rule. Many become special pets of their handlers. And this holds true, not only for the puppies but for all the animals at Hamilton Station.

"Give me a child for his first seven years and you can have him for the rest of his life." That saying has been attributed to Confucius. And much of modern child psychology rests upon it. The Bar Harbor project, however, can dig far deeper than can the most hopeful psychologist who deals solely with youngsters of the human race. Born at the Laboratory, brought up under completely controlled conditions and given careful daily checks, the puppies can be studied from their earliest reactions. Some are given identical environments and the development of their inherited traits is scrupulously watched. Breed is balanced against breed; individual, against individual. Natural tendencies to be aggressive, timid or friendly can be caught at their first budding. Other puppies with the same inheritance are placed in widely different environments. Breeds of totally dissimilar inheritance are

crossed and their offspring compared with the purebred strains.

After studying the puppies for their emotional heritage, the native equipment with which they come into the world, and after watching the effects of varied environments on the expression and development of these inherited tendencies, the scientists of the Jackson Laboratory turn their attention to the dog's ability to learn and, equally important, to remember what they have learned. Different methods are compared. Nor is their physical heritage neglected. Watchful consideration is given to the manner in which the dog's inherited physical makeup influences their ability to perform various tasks, such as retrieving, tracking and similar canine accomplishments.

A long-range program, the work is still in its infancy. But it will eventually be carried through to the third and fourth generation of offspring from dogs whose inheritance, behavior and life histories have been faithfully and minutely recorded. Students of heredity and human welfare will not be the only ones to profit from this program. To dog breeders and trainers it will prove a boon, enabling them to improve their stock and to bring out hidden and perhaps unsuspected potentialities. Results to date indicate a genetic basis for emotional traits and native abilities, yet a wide variation within each breed and an overlapping between breeds.

To weigh successfully the roles played by inheritance and environment in the brain power and emotional outlook of individual dogs, as much as possible must be learned about the manner in which purely physical characteristics are handed down from generation to generation. To this end, the Laboratory is carrying on a large-scale breeding experiment concerned with coat colors and patterns, and with such variations, abnormalities or irregularities of body form as indicate departure from the normal. Four basic color patterns for the dog have been established — solid dark color, either black or liver; brindle with dark stripes on a lighter background; sable or tan; and dark coat with tan muzzle, chest, feet, eye spots and spot beneath tail. These types are being crossed to see how they are handed down in a mixed heritage. The inheritance pattern of other characteristics is likewise being studied, such as spotting; the dappled coat; curly crossed with straight coat; rough, with silky coat; short hair with long.

To get additional background as to the inherited characteristics of the different breeds, the Jackson Laboratory has enlisted the cooperation of the American Kennel Club. Through this organization professional dog breeders the country over have agreed to supply records of the litters they raise. More than 3500 of these records have already been received and will be compared with the findings of the Laboratory. Such a program will help the breeders to produce high quality stock. It will also provide the Laboratory with a wider view of the genetic panorama.

Dogs are not the only animals kept at Hamilton Station for study in genetics and (Continued on page 220)



Wilderness Piece

By VIRGINIA S. EIFERT

THERE was a feather on the gold-green sphagnum of an arbor-vitae swamp in northern Wisconsin.

The sun shone upon the feather, the wind breathed upon it, the ancient coolness of the swamp cradled it. A pileated woodpecker had flown over the cedars and, cackling, had lost a long black and white feather from

one of its powerful wings. And the feather had twisted and twirled slowly toward the wet sphagnum moss, which carpeted so completely the black ooze of the swamp, and came to rest on a sunlit patch of the moss, and lay there, quietly.

It was quiet, and voiceless, and inanimate, yet the feather was a wild thing, a vivid piece of the wilderness that chose to wait there upon the moss for the slow finger of disintegration to blend it into its surroundings and make it part of the old swamp.

The swamp in which the feather lay was a tangled place of that ordered confusion that exists in old wildernesses in which the forces of disintegration are slower than the forces of weather, which create the confusion. In such a swamp trees are shallow-rooted. The earth is loose and sandy. These swamps are always wet, constantly saturated with water held in suspension in the sphagnum, water and moss that are always cold even in hot weather. There is no proper soil below the thick wet sphagnum to hold a tree securely in place. In consequence most of the cedars in this old swamp lean and bend. There came a further force, about the year 1910, when a deep, wet, abundant snow fell heavily all day and all night. There had been no cold weather to freeze the roots in the swamp. The snow was heavy. It weighted the branches, weighted any trunk that already was aslant. The roots in the soft black ooze could not hold fast. The cedars all that day and all that night slanted and fell. By the next day the swamp, in its deep hollow between the hemlock hills, looked



An old decayed birch trunk is an inviting dinner table for the pileated woodpeckers. The tree on the right shows the characteristic rectangular diggings of one of these woodpeckers, who worked in the forest near the cedar swamp.

as if a giant had been playing jack-straws. No tree stood upright — none but the huge old black maple at the far side of the swamp where the drier woods began.

Some years later the loggers came in. They left the swamp in a more confused state of destruction than the snow storm had left it. Now there were piles of slash; piles of stripped bark. Now many of the leaning trees had been felled and the stumps stood high. Sunlight shone broadly into what once was a kindly, shaded place, and the sphagnum moss bleached a pale yellow-green. But the tiny, sweet, white violets still blossomed and scented the air in late May. Little green orchids bloomed; there were pink moccasins on hummocks of moss. The snowberry still put forth its small wintergreen-flavored fruits in August. And the black water under the arched roots of the anguished cedars still was cold as ice water, even in full sunlight in mid-summer.

A far corner of the swamp had been sheltered somewhat from the full weight of the big snow. The loggers had not come in here. Now the cinnamon ferns uncurled tall and white and in June the royal fern opened its translucent ruddy leaves, and the white violets were sweeter than ever above the wet, wet sphagnum. The deer came in here to bed down in the heat of the day, and twitched off the persistently buzzing and biting deer flies that lurked in the sunny places as though in wait for a deer upon which they could bite.

High on the tapering tip of a tall tree an olive-sided flycatcher sat all day uttering its emphatic "Hic-three-cheers!" or, when disturbed, simply said "Pit," a thousand times without changing its expressionless accent. Purple finches sang briefly in the trees and picked at last year's little cones. White-throated sparrows in the slash of the open swamp piped their plaintive songs and built their nests in tangled shelters they found in the stacks of dried, cut branches. The mourning warbler sang in the slash piles; a black-throated blue warbler sang over and over, buzzingly, somewhere among the cedars. And there was a hermit thrush in the shadows, a thrush that caroled thoughtfully from the June dawn to the June dusk, from the time the first loon went over, yodeling in the pre-dawn darkness, until the horned owls began to talk in the forest, after half-past-nine at night, delivering its nocturnal avian solo as though master of the woods.

And the pileated woodpecker came to a long-dead arbor-vitae. With broad black and white capes of

wings, the bird rowed the air, and folded them, and swooped, and clung suddenly with great claws to the ragged trunk. The bird thrust its gaudy, red-crested head this way and that, eyeing the landscape, hitched itself spirally around the trunk, whanged away at the ragged bark and flung off shreds and splinters. But even to the tremendously strong neck muscles and beak of a pileated woodpecker, which is as big as a crow and

is biggest of all the northern woodpeckers, an old cedar trunk is too tough. It is wood which, when submerged in the cold swamp, may last unchanged for a century or two. Borers seldom penetrate the cedar wood. No insect, perhaps, is strong enough to get into the heart of a cedar and lay its eggs there, so woodpeckers find little to eat in the cedars.

The bird cackled shrilly; it thumped heavily upon the unyielding wood; opened black and white wings, and, in powerful strokes through the sunshine, left the tree. It was then that a wing feather detached itself and twirled slowly through the sunshine to lie on the golden-green moss. The pileated woodpecker flew brilliantly off across the cedar swamp to the old forest beyond, where there were many

dead aspens and birches of utmost softness and worminess, and vanished into the dark woods.

The feather lay quietly but vibrantly on the moss while the white-throats piped and the olive-sided flycatcher hiccupped, and the deer came to bed down for the afternoon rest. No one ever came into the old swamp now, not since the loggers had taken what they wanted. But that day there came alien feet and a camera, and the picture of the feather and the story behind it came away to tell the story at another time and in another way. A piece of the wild wilderness, the feather of a pileated woodpecker represents all that conclave of the wild — the bear, the eagle, the bobcat, the loon, the fox, the deer, the porcupine and the hermit thrush, and the strange, shy, prehistoric-looking pileated woodpecker with its flaming crest and its tremendous wings. These creatures are of the wild, and with the wilderness they perish; these do not belong with men and civilization. Although other creatures may adapt themselves to man and his ways, the wilderness folk must have the wilderness — the forest, the quaking bog, the wild lakes, the hills and the northern sky, and the untamed cedar swamp with its wet black holes, its icy water and its unstable footing where only deer may walk with ease upon the sphagnum.



"And the pileated woodpecker came to a long-dead snag of a cedar."

Beloved Names

By ELINOR HENRY BROWN

Angel-wings, star-flowers, Queen Anne's Lace . . .
Such names may be "common" — but not commonplace.



In the spring Nature stages a lavish and free garden show in the Smoky Mountains. This reaches a climax in mid-June, when the purple rhododendron splashes with color the mountain "balds" of the higher peaks.

Nature and Spring in the Smokies

Photographs by Paul A. Moore, Tennessee Conservation Department

WHEN spring comes to the Great Smoky Mountains they become the goal of Nature enthusiasts. This year the Nature activities will start with the meeting of the Wilson Ornithological Club, which will gather in Gatlinburg, Tennessee, April 24 to 27. From this gateway resort town, guided trips, open to bird students, whether members or not, will be conducted. More than two hundred species of birds have been identified in the Park.

In 1951 the first Spring Wildflower Pilgrimage in the Smokies was launched. It attracted more than four hundred people. From May 1 to 3 this year, the second Pilgrimage will be held. It is an event arranged jointly by Arthur Stupka, park naturalist, and the Botany Depart-

ment of the University of Tennessee, with the active co-operation of the Gatlinburg Chamber of Commerce. Field trips are led by trained naturalists and botanists who know intimately where to find the wild flowers on the 508,000 acres of Park lands.

Trips are arranged to suit the physical capacities of varied groups. There will be field trips for the hardier, and for those who cannot do much mountain walking, motorcades will go to roadside spots where wild flowers are in lavish display. The Pilgrimage will get under way May 1 with a get-together at the Hotel Greystone Playhouse in Gatlinburg. Color pictures of the flora of the southern Appalachians will be shown and described.

The Great Smokies are about evenly divided between



Mother bear and her cubs cause a traffic tieup in Great Smoky Mountains National Park. As in other parks, bears should be left alone, photographed at a safe distance and not given handouts. A mother with cubs is a specially uncertain animal.

North Carolina and Tennessee, and extend for an air-line distance of about fifty-four miles along the State line. At its widest point the park is about nineteen miles across. The elevation of the mountains, of course, provides a wide variety of vegetation, the higher spots having flowers and shrubs found much farther north, in Canada. Some 1400 species of flowers, shrubs and trees are listed for the Park.

Fringed phacelia and various trilliums are among the favorite plants blooming in prodigal array in spring. Great masses of phacelia cover the forest floor in places, and several species of trilliums are to be found. In spring, flowering shrubs add greatly to the display, with mountain laurel, flame azalea and purple rhododendron, which blooms usually in mid-June, outstanding.

Trained naturalists and botanists lead each group that comes to the Park to take part in the Wildflower Pilgrimage, which attracted more than four hundred its first year.



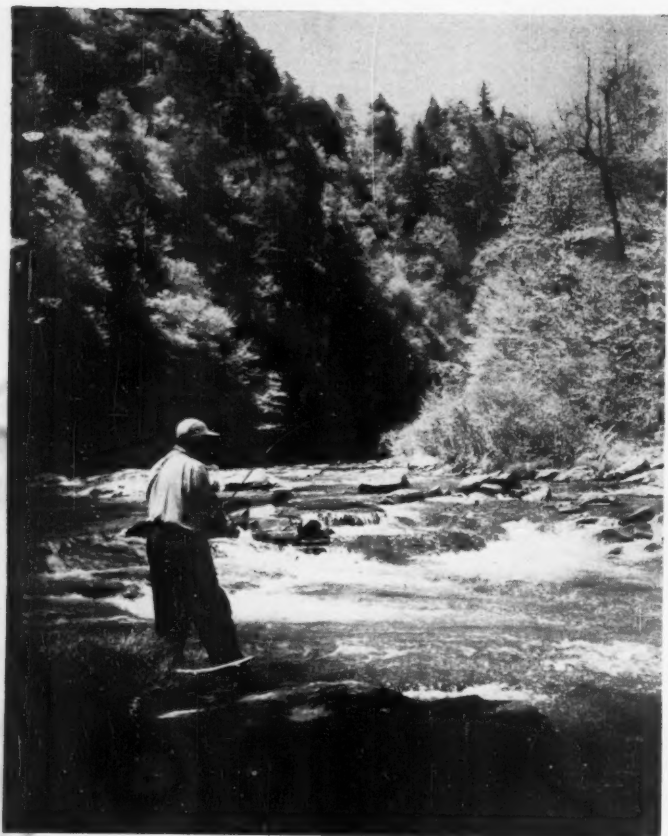
For youth or adult, it is a real treat to be in the Smokies when spring comes. A suggestion of its beauty is found in this luxuriant growth of trilliums in bloom.





Gatlinburg, Great Smoky Mountains National Park, Tennessee gateway town, is justly proud of its streets lined with flowering dogwood, its neat appearance and its lack of the tastelessness that typifies so many resort towns. An indication of the breathtaking wildflower display that spring brings to the mountains is found in vast beds of fringed phacelia, which, as below, seems to spread a snowy mantle on the floor of the forest.





Wild Is the Word for Linville

Western North Carolina has First
Official Wild Area East of the
Mississippi

By ERWIN A. HEERS

U. S. Forest Service Photographs

White is the water, but brown, rainbowed, and speckled are the trout. For the fisherman who cares to climb both down and up, there are thrills along the gorge's bottom.

THE march of time, with its relentless human push to populate the land, has left few isolated primitive spots of any great extent within the eastern United States. The Linville River Gorge in western North Carolina is one of the few.

On February 7, 1952, the Chief of the U. S. Forest Service officially established 7400 acres of the Pisgah National Forest, including and surrounding the Linville Gorge, as a "wild" area. At the same time Sam P. Weems, superintendent of the Blue Ridge Parkway, announced donation of approximately \$100,000 by John D. Rockefeller, Jr., for purchase of 1100 acres of private land lying between this National Forest "wild" area and the Parkway — an area which includes the famed Linville Falls.

The "Linville Gorge Wild Area" is the first such area to be established east of the Mississippi River. It is a first eastern counterpart of some 57 "wild" areas already established on western national forests. The western region also has 30 of the larger "wilderness" areas. Eastern national forests, thus far, have none.

First efforts to include the Linville area in some sort of National or State preserve date back at least three decades. Its scenic, wildlife and recreational features had been called to the attention of Secretary of the Interior

Hubert Work, whose committee, investigating the feasibility of establishing a national park in the southern Appalachians, visited the Linville area during a trip in 1924.

This committee's groundwork resulted in establishment of the Shenandoah and Great Smoky National Parks and the connecting Blue Ridge Parkway, but legislation to include Linville Gorge and nearby Grandfather and Roan mountains in the national park system was not passed.

Meanwhile, acquisition of lands for the Pisgah National Forest had included the Linville Gorge below the falls, the crests of Roan and the lower southeastern slopes of Grandfather. National forests are managed under the principle of multiple use, which features commercial timber growing and sales as the main source of income, but gives top priority on designated areas under its land use plan, to water management, recreation use, wildlife management and other special uses.

Shortly after acquisition by the U. S. Forest Service in 1938, the Linville Gorge section was included in the Daniel Boone Wildlife Management Area, which had been set up on adjoining Pisgah Forest lands the year before, through a cooperative agreement with the North Carolina Wildlife Resources Commission.

From a land-use priority standpoint, it was obvious that



A trail leads the hiker to an amazing wonderland, called "The Chimneys," about midway the eastern rim of Linville River Gorge.

the gorge area ranked supreme as a hideout for many species of game and fish. Here bear and deer could rear their young with least chance of molestation. Here were found grouse, squirrel, coon and 'possum. Trout and bass were in the river.

From the standpoint of recreation, the area also rates highly. There is much of scenic grandeur. Two of the most oddly precipitous mountain peaks in the southern highlands — Table Rock and Hawkbill Mountain, form part of the gorge's eastern rim. Wiseman's View, a comparatively flat shelf on the western rim, commands an excellent vista. Shortoff Mountain, guarding the canyon's southern mouth, was fashioned by Nature in the form of a giant, global monolith, but ages of water action have left it sheer and denuded on the river side. And the picturesque "Chimneys," between Shortoff and Table Rock, are a contrasting galaxy of rocky spires, overhanging boulders and irregular fissures.

From Linville Falls, at the northern end, the river tumbles through more than 12 miles of devious, rocky channel, out past Shortoff to soothe its fever in the placid waters of Lake James, more than 2000 feet below. Nowhere throughout its length are the rampart boundaries of

the gorge more than one and one-half miles apart. The forest cover within the area is mainly virgin.

With prospective purchase by the National Park Service of the 1100-acre "Hossfeld Tract," controlling the falls and upper gorge of Linville, there will be created a solid 10-mile stretch of scenic wilderness, extending from the Blue Ridge Parkway and bordering it approximately for a mile and one-half.

Definition of a "wild" area, according to regulations of the Secretary of Agriculture, is little different from that of a "wilderness" area. There is no difference as to administration and use restrictions. The main difference is size. Whereas the wilderness area must contain at least 100,000 acres, the wild area may be considerably less, but not less than 5000 acres. Also, final action in wild area establishment rests with the Chief of the Forest Service, and does not require Secretarial proclamation.

The regulations state that within these areas "there shall be no roads or other provision for motorized transportation, no commercial timber cutting and no occupancy under special permit for hotels, stores, resorts, summer homes, organization camps, hunting or fishing lodges or similar uses."



Although a faint pulse indicated that the squirrel was still alive, hope for its survival was dim. However, artificial respiration was undertaken. Here the squirrel had not yet opened its eyes to reveal the pink eyes that marked it as a real albino.

First Aid for Chipper

By MARIUS SCHNEIDER

ACCUSTOMED to the daily visits of many gray squirrels who inhabit the wooded slopes about our country inn, the appearance, in mid-June, of a snow-white squirrel was an event. Apparently a young squirrel, it defied all attempts to become acquainted. Then, a few days later, we found the squirrel close to a basement window, seemingly dead. A faint pulse was detected, so the little fellow was moved into the warmth of the sun and artificial respiration undertaken. Its hind limbs were massaged and its front legs manipulated. Meanwhile, one of the rescue party brought a mixture of warm milk and whisky, which was forced through the squirrel's jaws, drop by drop.

After a half-hour of such solicitude, the squirrel opened its eyes slightly. They were pink, characteristic of a true albino. Another helper had telephoned to Amenia, New York, to seek the advice of veterinarian Dr. W. B.

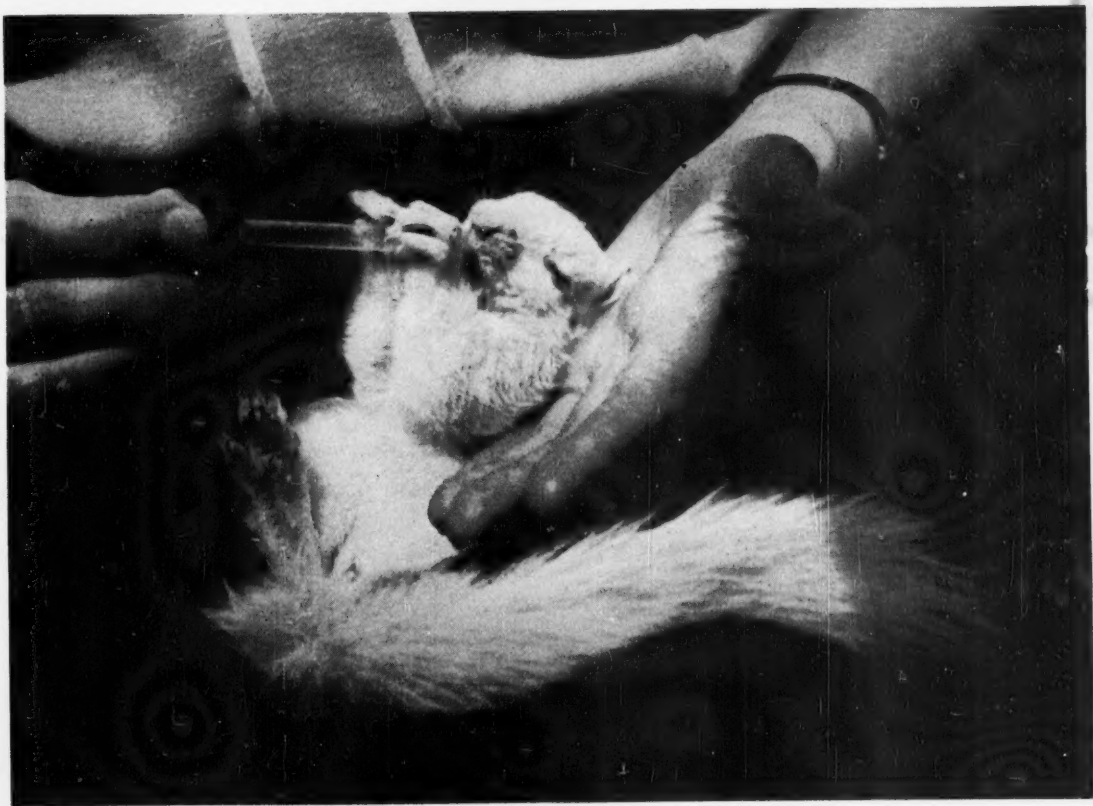
Lukens. He was not hopeful of success, but suggested adding pabulum to the milk and whisky. He also ventured the opinion that, being an albino, the squirrel might have been regarded as a freak by his mother, ousted from the family circle and thus become a target for attack by other squirrels.

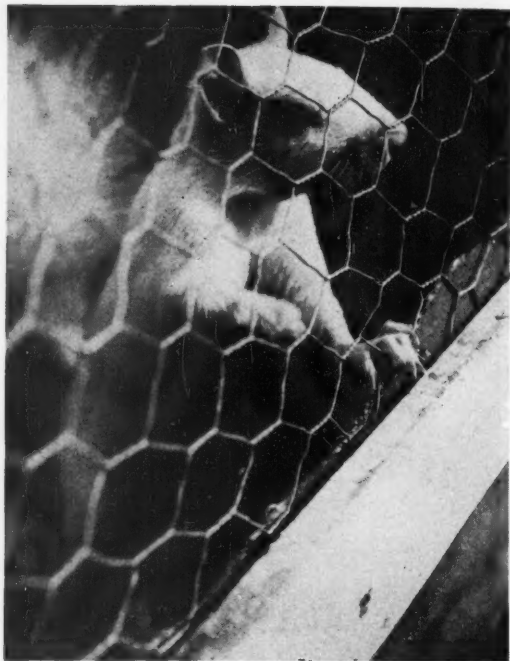
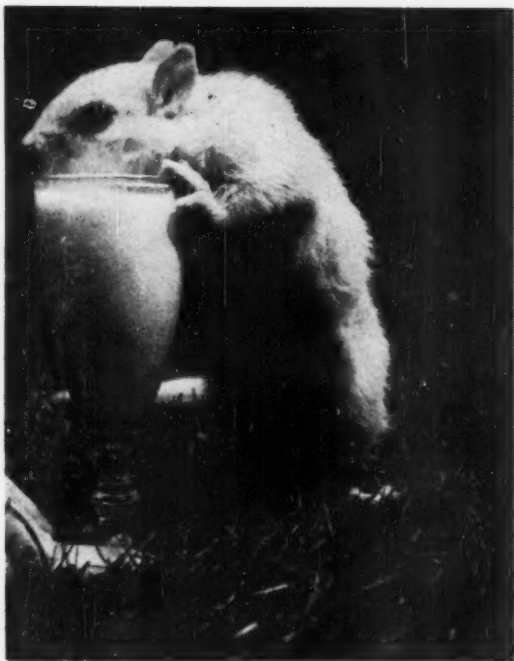
Whatever the history of the case, our charge had everyone concerned about his welfare. After two anxious days, progress could be recorded. After a week he was definitely convalescent. He ate desperately, as though he had long been starved. He seemed to recognize us as friends, to take interest in his surroundings. It was time to name him, and, still hopefully, he was called Chipper, a name he was destined to live up to. Finally, provided was a proper residence, he prospered and, today is a healthy, frisky guest. Bringing him through was worth the effort.



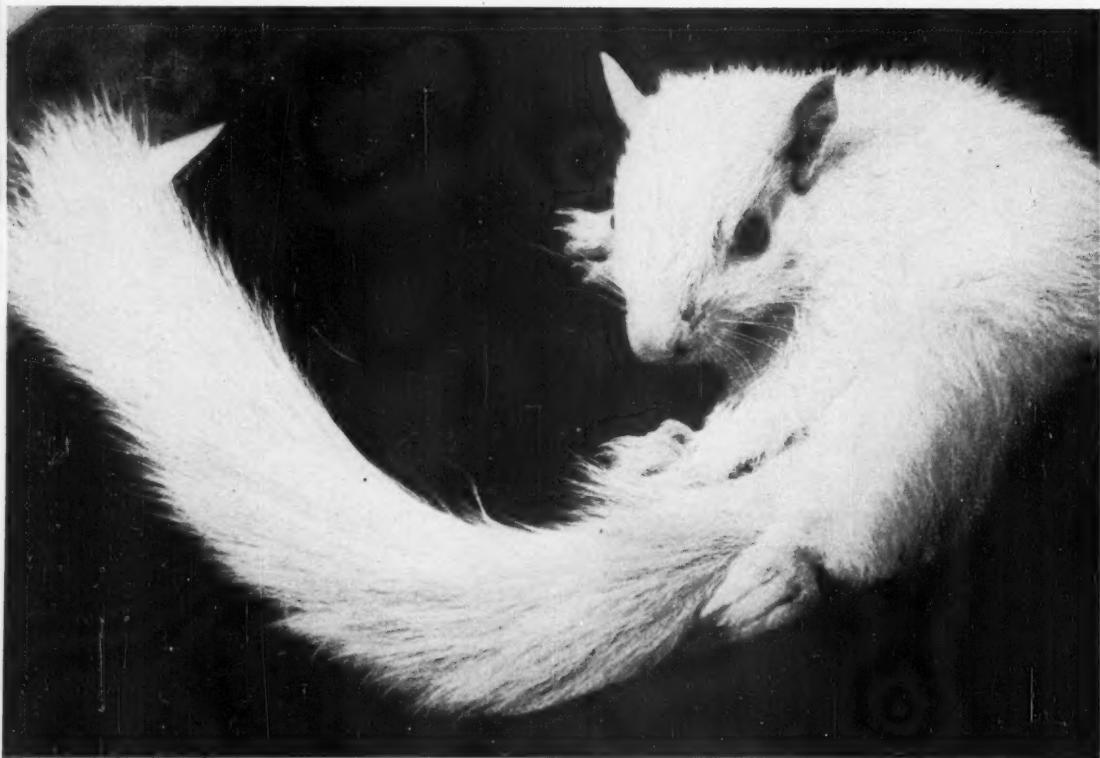
Chipper's jaws are sponged prior to opening them and forcing through a mixture of warm milk and whisky. Up to this moment the squirrel had made no bodily movement that gave us hope it would survive.

With the spark of life still burning, attention was given to wounds on the squirrel's body on the second day of its convalescence. Then, after another day of complete rest in a warm bed, with careful feedings as prescribed by the veterinarian, Chipper is fed with an eye-dropper. The albino was still too weak for any real movement, but it did make feeble attempts to grasp the eye-dropper in its paws.





At the end of a week Chipper, by then named, was able to stand up and take nourishment. (Above, left) His diet was still liquid, a thin gruel reinforced with a vitamin and mineral product. He was well on the road to recovery. After another week (below) the albino was ready to pose for his picture, his fur much improved and his tail something of which to be proud. After seven months, provided with a comfortable home, Chipper is healthy and well nourished, frisky and friendly and enormously popular with everyone.



Saguaro forest road. Many miles of roads and trails wind through Tucson Mountain Park. There are excellent picnic areas, and numerous places where one may stop to enjoy the view close at hand and far off.

PHOTO BY M. H. FROST



Blazing New Desert Trails

By WILLIAM H. CARR

NOT FAR from the desert city of Tucson, Arizona, there is a large and particular kind of green forest. It is not the "usual" sort, with waving, leafy branches, but a veritable forest nonetheless, a broad expanse of mighty saguaro cactuses stretching off into the distance. They stand, like a huge army of enormous soldiers, at attention, with stationary arms flung outward and upward, forever frozen in varied positions. This is the largest and healthiest collection of saguaros remaining in the United States, and this 30,000-acre region is known as Tucson Mountain Park.

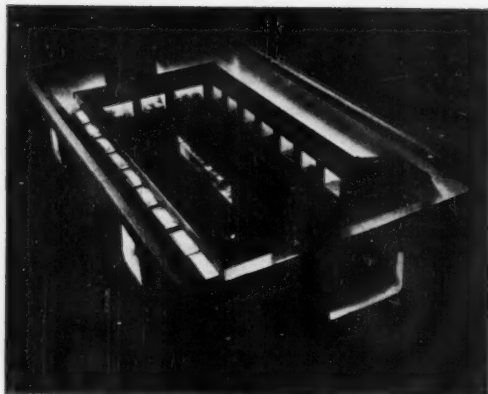
In the center of the area is a low, sun-baked adobe building, some two hundred feet in length, that blends admirably with the desert landscape. It is here, in this warm brown structure, that outdoor Nature education is to receive a very real impetus in the American Southwest, for the building will be the headquarters for the new Arizona Desert Trailside Museum and Botanical and Zoological Gardens.

There could scarcely be a better location for such a project. Five serrated mountain ranges may be viewed from the large patio of the building, and the great Avra Valley reaches far to the horizon and is lost in Mexico, some forty miles southward. The rugged, multi-

colored, volcanic Tucson Mountains rise in the rear of the structure, saguaro-covered to their summits. All that remains to be accomplished is to interpret the various natural features of the region for the benefit of the 200,000 citizens of Tucson and Pima County, and also for the hundreds of thousands of visitors who come to southern Arizona each year.

Before many seasons have passed there will be a ten-acre fenced area adjoining the building to the south with most of the native desert plants on view, including some three hundred desert trees and shrubs and other flowering plants, and more than eighty kinds of southern Arizona cactuses. Nearby will be large, earth-colored pits containing desert mammals, ranging from the powerful jaguar, which occasionally wanders into the region from Mexico through a barrage of bullets and past poison baits; the lithe, tawny and equally persecuted mountain lion; the "wild pig," or peccary, of the desert; and some twenty other wilderness inhabitants, all of which will be made comfortable, or will not be kept.

The objective will be to concentrate living wildlife residents where visitors may examine them carefully and at length. Here, in a few hours, one may gain a



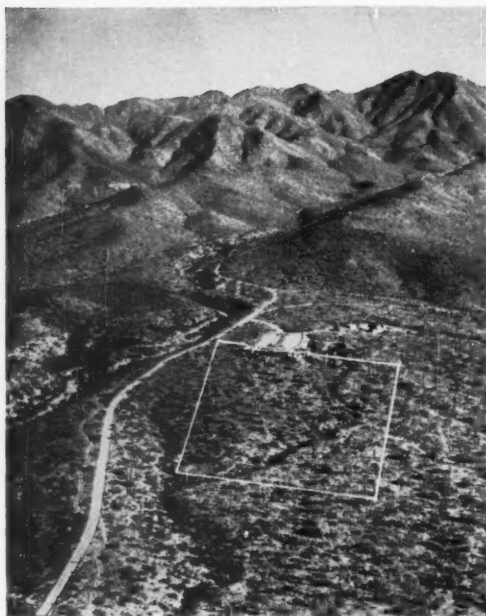
Model of Desert Animal Room to be located in the west wing of the Arizona Desert Trailside Museum. This large, air-conditioned room will house living small mammals, reptiles, amphibians, and insects. Especially designed cages will flank the walls, be viewed through windows from the front and serviced from the rear. The "Insect City" will be in the center of the room.

greater knowledge and understanding of desert fauna than in many years of journeying, and the same thing applies to plant concentrations. The gardens, both botanical and zoological, will be as naturalistic as possible, with many original features dictated by the location and climate. In effect, the institution will be a key to the desert so far as wildlife and plant life are concerned.

The sweeping vistas that are visible on all sides of the enclosed area spell wilderness of a unique sort. The broad, often friendly, yet little-known arboreal American desert will here find interpretation and greatly-to-be-desired aid in relation to conservation principles and practices gained through actual observation "first-hand." An outstanding way to implement resource conservation principles is to acquaint the public with the living as well as with inert entities involving the land itself.

The building will become a Trailside Museum, and will serve as a focal point for all the outdoor exhibits. There is a fine room in which to display the rocks and minerals of the region, and to tell something of the wonderful story of Arizona's rich mines, past and present. The vital subject of ground water will also receive adequate attention, as will watersheds. Water is all-important in this arid land, and has been seriously neglected in public educational interpretive devices, such as dioramas and other visual aids, and despite yards and yards of newspaper "copy" relating to water shortages.

An adjacent room to be known as the Arizona Desert Small Animal Room, will house small living mammals, reptiles, insects and their allies, and amphibians. In



AIR PHOTO BY MR. AND MRS. GEORGE W. CHAMBERS

Tucson Mountain Park, near Tucson, Arizona, is the healthiest and largest saguaro cactus forest in the United States. The white lines represent the fenced enclosure for the Arizona Desert Botanical and Zoological Gardens. The large building will be the Trailside Museum. The educational area is in the center of the 30,000-acre park.

similar fashion to their relatives outdoors, these creatures will serve as ambassadors for their kind, thus improving the relations between man and wildlife for the profit of both.

Nature trails of varying types will radiate from the gardens. The park now contains many miles of excellent foot and horse trails. The King's Canyon trail, starting practically at the museum doorstep, will become a leading Nature trail. It is about two miles in length and winds through a splendid desert area, along the side of a large arroyo, where geological exposures show earth-forming structures of different eons in almost "textbook" illustration manner. The site is a mecca for geology students from the nearby University of Arizona. The plant life bordering this trail constitutes a botanical garden in itself. Similar to other trails, there will be both "read-as-you-go" labels and individual posted numbers beside natural objects along the way. The numbers will refer to information on printed or mimeographed sheets obtainable at the Trailside Museum. There will be question and answer sheets, too, one sheet with questions and another, supplied to group leaders, with the answers. These will also refer to numbered objects, make identification easy.

Arizona Desert Trailside Museum entrance. Located in the center of a 30,000-acre saguaro cactus forest, the new museum will seek to interpret desert life of the American Southwest.

All labels along the trails will contain information as well as names, and at the beginning of each trail will be this sign, reminiscent of a similar sign placed at the head of another Nature trail in a far-off State many years ago:

Let the labels serve as a naturalist friend, well acquainted with this desert country, who is walking with you and telling of the natural features along the way.

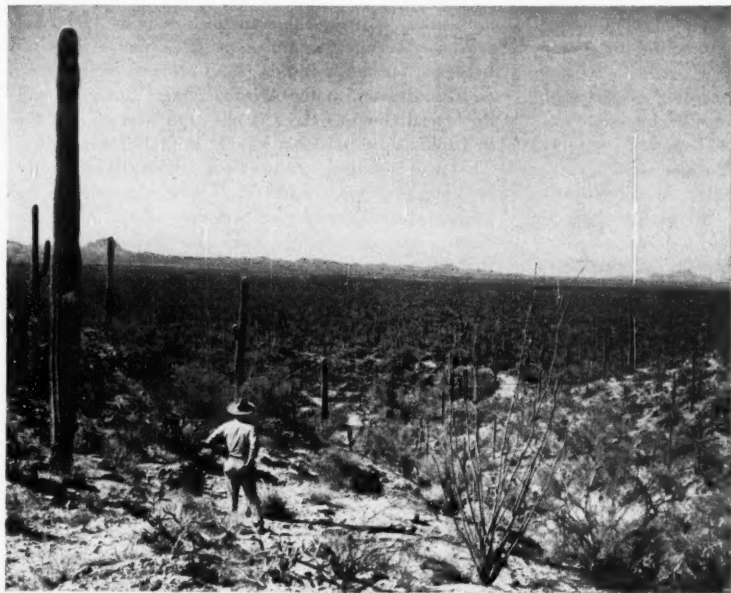
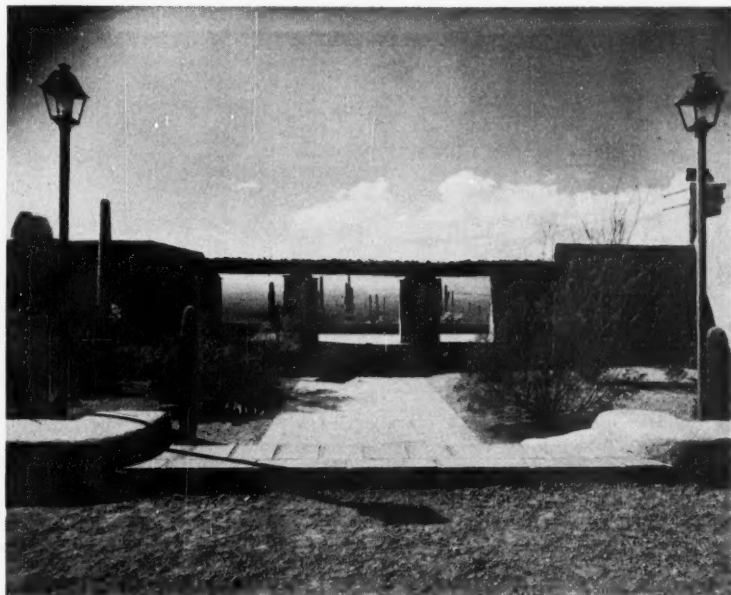
The first part of the new institution to be completed will be a section of the Trailside Museum devoted to the display of the smaller animals. This should prove a fascinating place for all who wish to obtain an intimate view of many of the smaller living desert creatures, ordinarily observed fleetingly or not at all. These smaller animals include a number of the most interesting desert dwellers, many of which are nocturnal in habit. The kangaroo rats, master water conservation-

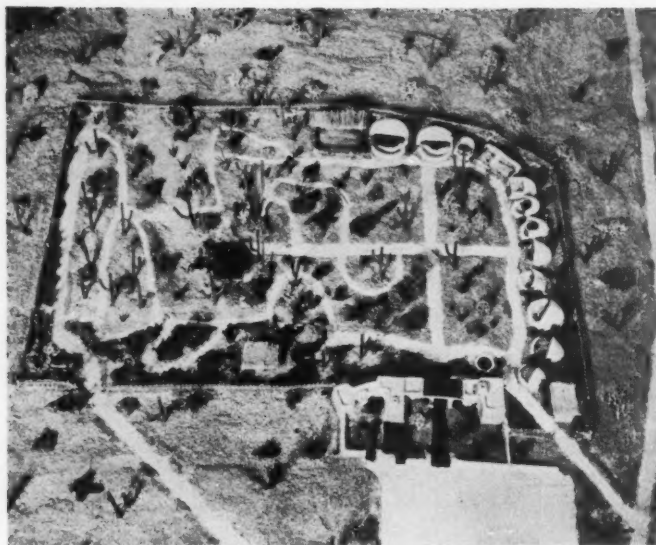
ists that they are, will be featured here as will other desert rodents — the pocket mice, Arizona roundtail and Harris ground squirrels, and that dry-land home builder, the desert pack rat, justly famed in song and story. All will be comfortably housed in roomy cages and well protected from the public, yet available to assist in interpreting the story of desert wildlife.

One of the subjects of leading interest to desert visitors, and to residents of desert country, is the ability of certain creatures to exist for long periods without access to any standing water whatsoever, and in the face of extended intervals when the hot, highly evaporative atmosphere would seem to be capable of removing whatever degree of moisture existed anywhere. The story of how some desert rodents, through the miracle of metabolism, are enabled to create life-saving moisture within their own bodies from a diet of

Desert vista. Ranges of serrated mountains rise on all sides of the Tucson Mountain Park Saguaro Forest, forty miles north of the Mexican Boundary.

PHOTO BY M. H. FROST





Model of Zoological and Botanical Gardens. When completed, the new Arizona Desert Zoological and Botanical Gardens will look like this model display. The structures on the right depict large mammal pits. The botanical gardens will be established in the left half of the area. The Desert Trailside Museum may be seen in the lower right side of the picture, fronted by the parking space. The fenced enclosure will cover ten acres.

air-dried seeds is one that will be told in connection with the indoor animal exhibit. The kangaroo rat will be prominent in this connection for, in addition to "manufacturing" his own inward moisture, he also conserves it by "holding on" to just about every drop. Other factors relating to adaptations for survival under desert conditions will also be featured in this lower Sonoran desert exposition.

In accordance with a policy of avoiding any attempt to confine song birds, other means will be used to depict desert bird life. There will be a large and complete collection of colored pictures of all native species, carefully presented and adequately labelled, stressing identification and habit information. No mounted specimens will be used, for it is the aim of the Trailside program to avoid duplication of displays in municipal museums. It is believed that an excellent way to encourage bird observations in the region will be to provide the visitor with the means of identification and to make every effort outdoors to attract wild birds to frequent and nest in the zoological and botanical gardens and in the nearby territory through the placement of feeding stations, nesting sites and watering facilities. Desert bird dwellers seem particularly susceptible to man's blandishments, and accept invitations to pay long and often permanent visits to places where humans extend a real welcome.

A special exhibit in the animal room will be a large "insect city." This display of living insects will in-

clude many of the social varieties, shown behind glass in the center of the room. The exhibit case will be eighteen inches wide and twenty feet long, with insect compartments placed on three glass shelves. All exhibits will be visible from two sides and will be lighted from above and below, with light-operating buttons placed beside each display. In addition to this "city" with many apartments, there will also be insect homes in a large space near a window to permit certain species to enter and leave freely through tubes connecting cages with the open air. Insects are among the most interesting of all desert dwellers, and when well displayed will tell their own story. Insect allies, also maintained alive, will include scorpions, centipedes, and, of course, the spiders, not to forget the trap-door spiders and those glistening tarantulas, really meek creatures that look far more dangerous than they actually are. Many will be the questions asked by visitors who look long and patiently at the inhabitants of "insect city," and many will be the excursions to books of reference on the part of museum employees who

seek to answer some of those same questions!

There is much satisfaction that comes to those who plan outdoor interpretive institutions, and who are then permitted to carry on with the work that leads ultimately to the hoped-for fruition of those plans. Almost always there is some unselfish individual who can see miles beyond the tip of his nose, and who is responsible for the initiation of all projects of this sort. In connection with the Arizona Desert Botanical and Zoological Gardens there is one man who started the ball rolling, and who has kept it in motion ever since. That man is Arthur Newton Pack, who should certainly be known to the readers of *Nature Magazine* as its former editor, and as past president of the American Nature Association. Mr. Pack accepted an invitation to become a member of the Pima County, Arizona, Park Commission, and shortly became Chairman of the Desert Wildlife and Plant Committee of that body. Simultaneously things began to happen. Somehow he had heard of the writer's former activities in the field of outdoor education elsewhere, and, inasmuch as said writer was also a member of the same Park Commission, a meeting was inevitable.

One evening, in Mr. Pack's Tucson Ghost Ranch Lodge, there was a convocation of the Desert Wildlife and Plant Committee, also attended by Mr. Herbert C. Fletcher, Chairman of the Tucson Mountain Park Committee. The initiation of the idea for the new institution started that night with Mr. Pack's sug-



PHOTO BY GEORGE AND IRENE OLIN

Gila woodpeckers are as much at home in the saguaro forests as are robins on an eastern lawn. The alert birds excavate holes in saguaro trunks and raise their young inside of the large green stems. Arizona has its famous Gila River, Gila County, Gila monster and the Gila woodpecker — all named for a tribe of Indians.

gestion, "Let's do something for Tucson Mountain Park; something that all the people may benefit from; something for conservation!"

A survey was made of the entire park by the writer, with funds provided through Mr. Pack's effort by the Charles Lathrop Pack Foundation of Washington, D. C. Mr. Pack, just incidentally, is vice-president of that particular Foundation. So, several months later, with the entire Commission's approval, and with the acquiescence of the three-man Park Committee, the actual governing agency, work commenced upon plans for the development of the gardens and the Trailside Museum. Mr. Pack, on behalf of the American Nature Association, offered \$10,000 to start the wheels turning, and, at the present time, something is indeed be-

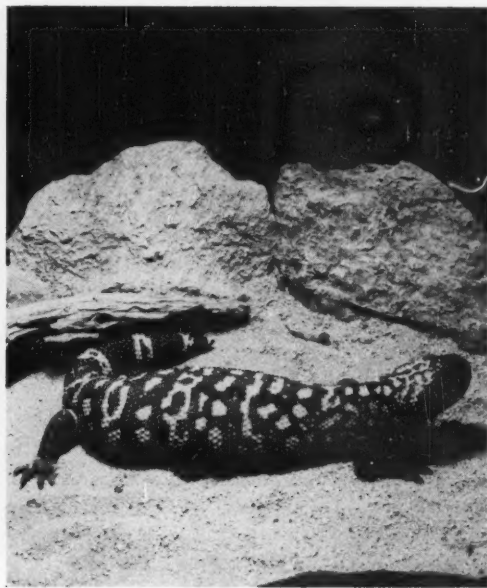


PHOTO BY M. H. FROST

The Gila monster, beaded lizard of desert regions in Arizona, is now protected by State law, being the only poisonous creature so designated in the country. The colorful reptile is becoming scarce and will be exhibited in the Trailside Small Animal Room with a label explaining that he "minds his own business."



This large cristate saguaro cactus thrives in a veritable jungle of desert growth in Tucson Mountain Park near the Botanical Gardens.

ing done for Arizona's Tucson Mountain Park.

With these beginnings, the effort goes forward. The need for this institution is outstanding, for while Arizona still maintains some of its former wilderness conditions, great changes are nevertheless taking place in the landscape. These changes are visible everywhere; in the desert country especially. Exploitation of enormous areas of desert land for the cotton industry alone is altering the appearance of much of the region. With increased industrialization of former sleepy towns and cities, and the mushrooming population increases in the State, some areas must be set aside and protected at once. Tucson Mountain Park is such an area. It had been set aside in 1929, but certain protection features had been sadly lacking, despite

Of wide distribution, the gray fox also lives in the Arizona desert. It is a gray-red sprite, living in the cactus forest, and hunting mainly at night.

PHOTOGRAPH BY MARVIN H. FROST

excellent work on the part of volunteer groups responsible for its well-being.

The botanical and zoological gardens and the Trailside Museum in the center of this beautiful area will do much to inform citizens of their plant life and wildlife heritage. Staff members will exert considerable effort toward maintaining and improving the entire cactus forest. Eventually the park will be used by all the people and will be one of the leading educational, inspirational, and recreational features for residents and visitors to the Southwest.



Restoring Claytonia

By EDWIN F. STEFFEK

ANYONE interested in conservation and restoration of our native wild flowers might well begin with the dainty spring beauty, *Claytonia virginica*, which once carpeted large tracts of open, slightly moist woodlands from Nova Scotia to Georgia, and from Saskatchewan to Texas.

This flower is comparatively easy to grow and spreads quickly by seeds, soon forming large colonies. Although a woods dweller, it responds well to cultivation. It will grow in almost any ordinary soil, but does best in deep, rich leafmold.

The plant grows from a tiny corm buried two to three inches in the soil. Each spring it throws up its dainty little pink or white bells on stems four to six inches tall. Transplanting is best done when the narrow, almost grasslike leaves begin to yellow and die down, although it can be moved while still in bloom if large sods are taken, or sufficient care given. Later in the season the dormant bulbs can be dug up and sifted out of the soil, but, in any case, care should be exercised to harm as few bulbs as possible in the digging.

Likewise, one should always keep in mind that while this dainty little wildling spreads rapidly, if growing conditions are to its liking, it can disappear with equal rapidity if picked too freely. This is especially true near large cities and towns, since the leaves are usually picked with the flowers. Thus deprived of their food factories, the plants cannot store up enough food for the next year's growth and soon wear out. To make matters worse, the flowers generally close up after picking anyway, and are discarded by the picker.



If you want to do your part, start some spring beauty plants from seeds planted where they will not dry out too readily, purchase a few plants from a dealer who grows them, or rescue some from a road construction job where they would be sure to be destroyed. Then plant them out where they will multiply and distribute your surplus to likely locations from time to time. In this way you will be practicing real conservation.



A small group of the Olympic elk, one bull with his harem of four cows and the half-grown calf of one of the cows. The bull may have cut out these cows from the harem of a bull too busy fighting off other "outrider bulls" to prevent the loss. Now they graze peacefully together in an alpine meadow.

The Crislers, A Wilderness Legend in the Making

By IRVING PETITE

JOHn Muir has immortalized the High Sierra. Henry Thoreau made a byword of Walden Pond. Lois and Herb Crisler are doing much the same thing for the Olympic National Park, 860,000 acres of primitive mountains and rain forests in the extreme northwest corner of the United States.

In these mountains the Crislers, as with naturalists before them, have found a way of daily life, coupled with accomplishments to make more understandable to man his place in Nature's scheme. But where the tools of others have been note-pad and pencil, the Crislers report life in one of the last wilderness areas of the United States on film, in color and in motion.

The legend, which they have been ten years building, and part of which will be seen by millions in their film, "The Olympic Elk," the fourth in Walt Disney's True-Life Adventure Series, is one of team strength. What one lacks, the other supplies, an advantage no solitary naturalist can know.

Herb Crisler, who has experienced almost none of the confinements of formal education, says, in his brief introduction to showings of their films: "I married my education. . .," for Lois was an instructor in English at the University of Washington before their marriage in 1941. Just as truly, she married her "wilderness" education. For while she was reading Aldous Huxley, Herb was reading the running-tracks of mice, the migrating trails of elk, or noting the travels of cougars as revealed in the snow that covered the Olympic slopes.

While Lois was contemplating Virginia Woolf, Herb was studying the equally subtle changes of season in the Olympic high country, where he was a temporary Park Ranger, and where he began photographing the animals in 1919. While she was smiling over some philosophical sally of Bertrand Russell, he was developing his own brand of humor, a trait as marked in the pioneer or wilderness character as is strength and purposiveness. One Crisler photograph, now in the files of the Seattle Chamber of Commerce, shows him eating grouse and grapes on a pinnacle of naked stone across from Mt. Olympus. His hair blows in the wind, and beside him on the stone needle is a vase full of wild flowers, carried up carefully from valleys far below for the purpose of one mad time-exposure.

While Lois taught students how best to "express" themselves, Herb's philosophy was maturing. This was developing through such experiences as the one that he has lately come to call "the wilderness conversion." Always at home outdoors, he took up a challenge from brother members of a Seattle sportsmen's club, and, in 1931, traveled through the Olympics from north to south on foot with, as he says, "no food, weapons, matches, sleeping-bag or salt." He had nothing but a pocket-knife and the senses and wisdom of a woodsman.

The story of Herb Crisler's experiences was syndicated in the *New York Times* and the *Seattle Times*. Spiritually, to him, the important thing was not the

manner of his survival, but the new respect he gained for wilderness creatures as he observed them, isolated with them in the Olympic vastness without a thought of hunting them.

"For the past thirty years," Crisler says, "I have been going into the Olympic wilderness area, and about twenty years ago I began taking a camera instead of a gun. At first I showed the films to my friends, then to local clubs, in the desire to give to others the preservationist attitude toward wildlife."

This preservationist attitude was given clearer voice through marriage to Lois. Herb met her when she was on a Mountaineers Club pack trip, of which the National Park Service had commissioned him to make a movie. They met in the spring of 1941; in December they were married.

Shy and, although taller than her husband, delicate in health, Lois was dropped immediately into a rugged environment, for they went to live at Humes Ranch, an ancient homestead within the limits of the Olympic National Park. The puncheon-floored cabin was no "cottage." Chinking had fallen from between the logs, letting in raw winter winds. The stove coughed on rain-soaked wood. Pack rats had made an odoriferous shambles of the three rooms. Lois shivered as she hugged the stove while Herb made trips for supplies to the car, parked on the nearest road nearly three miles away. She had lived on a sixty-by-twenty-foot lot in Seattle; here the nearest neighbors were seven miles away.

The following winter neighbors were even farther away, for the Crislers were employed as airplane lookouts on Hurricane Mountain. Much of that year they were snowed in, and existed in a many-windowed, thirteen by thirteen-foot shel-



Lois Crisler, who left the faculty of the University of Washington to live in the wilderness and help to launch a wilderness legend.



Herb Crisler, naturalist, photographer and wilderness preservationist. Recently he has been noted for a luxuriant black beard, a most effective trademark of the outdoors.

ter anchored to the rock of Hurricane with cables. A three by six-foot shelf in this precious space was devoted to Herb's garden of vitamin-stocked lettuce plants in flats. This greenery stood them in good stead, for they experienced just two seasons — winter and August. Lois recalls, with a somewhat grim smile, that the day she escaped burial under a mountain avalanche Herb celebrated by serving some of the first lettuce.

Down at Humes Ranch, the following year, Lois' eyes opened at sight of a weasel lifting his paw at the kitchen door, and a pine squirrel unrolling yards of tissue, dragging it from the outdoor "powder-room" and up the bank to his nest. Once, at Herb's call to "Come look," she left the house to see a cougar facing him as he came with his wheelbarrow from the forest. The huge cat's tail flicked and it played a cat and mouse game with Herb, then floated past him and into the shadows. Herb insists that all it wanted to do was play.

Another time, Lois met her husband coming from the homemade greenhouse with closed hands. Inside one was a tiny, dainty hummingbird and inside the other, two more. The one he handed her lay on its side on her open palm as if paralyzed, then suddenly blinked its eye and shot away. "Found 'em on the tomato plants," smiled Herb, with his Georgia mellowness of tone, which the cold of Olympic winters had not been able to sharpen.

In the fall there were deer in the pastures. And in the spring the Crislers could watch from their west windows a large herd of Olympic elk fighting their way across the swollen Elwha River and starting their annual migration toward the mountain peaks.

Herb Crisler with his \$1000 camera given him by the citizens of Port Angeles in appreciation of the work of the Crislers for the wilderness. In the middle distance is Mount Olympus.



Summers they spent — as they still do — in the high country, following with their cameras the life cycles of animals and plants; fitting together the pattern of Nature. They have come to know all animals — wasp to elk, bumblebee to black bear — as individuals; as quixotic, serious, inquisitive and full of fun as animals of the human species.

They study the animals with respect, as they photograph. But the actual picture-taking, like the baking of bread from wheat they grind themselves, is only part of a series of projects that make up life in the wilderness. For as Lois wrote in November, 1949: "By the way, Cris figured up the other day, we only hunted with the cameras ten days this past summer. But we were out July, August and September. The rest of that time was spent getting up supplies, traveling with backpacks to and fro from cache to cache, or else in rain.

"But for 'Beyond The Trails,' our new picture that we have been three years in making, 900 man-days have gone into the preparation, filming and editing. Not eight-hour days at that, but from daylight till dark."

The film she described was later that year purchased by Walt Disney. Renamed "The Olympic Elk," it depicts the life cycle of individual elk and of the elk herds. The picture culminates in a fight between two bull elk, a phenomenon rarely seen by humans. As Herb said in 1949: "I've been taking movies of the animals for fifteen years. In all this time I have only seen three fights and this is the only one I was able to film."

Living in the wilderness, the Crislers have recorded what Lois calls "the biotic community" with such love and understanding that demands for showings of the films have come from all over the country. The past three winters they have driven their panel truck, with its precious film cargo, across the continent on 20,000-mile tours. They have shown before such audiences as those of the American Museum of Natural History in New York, the National Geographic Society in Washington, D. C., and others.

Knowledge of the interrelations of all living organ-

isms as they occur in the Olympics has so inspired Lois that she has become, according to Mason Sutherland of the *National Geographic Society*, "one of the two finest women film lecturers in the country." And the animal photography of Herb, together with his adventures in the Olympics, are part of the wilderness legend-in-the-making.

Perhaps because they daily relive the frontier conditions of wilderness life, the Crislers are able to work together toward a goal and for a purpose larger than either one alone.

Friends in the cities think of them as having "given up" a great many of the comforts of "civilized" life. And granted that it is difficult to pack the necessities of life three miles (even with the aid of a motorized wheelbarrow, recently given Herb by an inventive friend in Los Angeles); to light the lamps and keep wood fires going; to cook on a range that was ancient twenty years ago. Still, in the very losing of the luxuries that most of us take for granted, or demand for ourselves, they have found the larger luxury of facing outward together, toward things which most of us are able only to glimpse for a moment now and then.

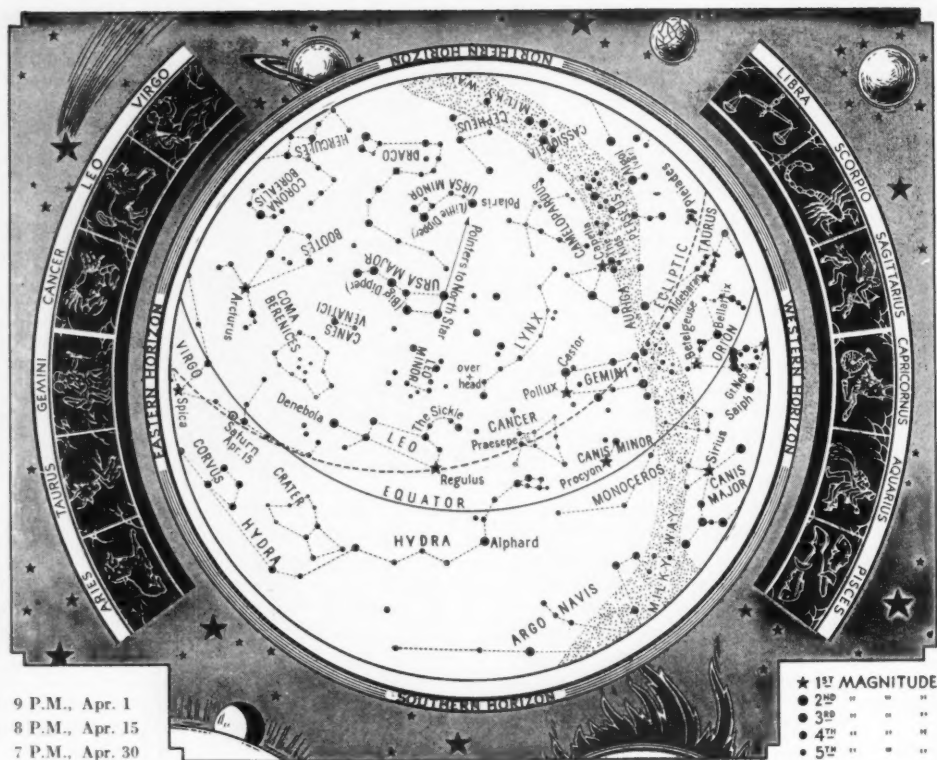
One such glimpse will be possible through their film. From "The Olympic Elk" millions of Americans may be able to understand, if only for an interval, man's place in Nature's scheme of things. They will see the results of a decade of selfless devotion, by an inspired team of naturalists, to one of this country's last real wilderness areas — the great Olympic National Park.

Lady's-Slipper

By VELMA FEHLING

Never did a slipper tread so lightly
So silken-soft upon the forest floor,
And never did a blossom pale so whitely
To see a fearsome bee come to its door.

No gayer tasseled, rosy-ribboned sandal
Did ever on its woodland cushion stay;
And where, oh where the ruthless, reckless vandal
Who'd take so sweet and small a shoe away?



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

Mars Returns to Opposition

By ISABEL M. LEWIS

AT INTERVALS of about two years and fifty days the planet Mars comes into opposition to the sun, at which time the earth comes directly between the sun and the planet. Within a few days of that time Mars is nearest the earth. Opposition this year will occur, to be exact, on April 30, at 8:00 P.M. Eastern Standard Time, when Mars' distance from the earth will be approximately 52,360,000 miles. It will be nearest the earth eight days later, when its distance will have decreased to a minimum, for this revolution of the planet, of about 51,860,000 miles. At the time of opposition the planet will be visible throughout the night, and will be on the meridian at midnight.

All oppositions of Mars are not equally favorable. The least favorable occur in January or February, the most favorable in August or September. At a most favorable opposition of Mars, when the planet is less

than 35,000,000 miles from the earth, it is about 27,000,000 miles nearer to the earth than it is at the most unfavorable opposition, when it may be close to 63,000,000 miles from the earth. All of this follows from the fact that the orbit of Mars is far from being circular. It is decidedly elliptical in shape. There is a variation of more than 26,000,000 miles in the distance of the planet from the sun. Favorable oppositions occur when the planet is close to perihelion, or nearest the sun at the same time that it is nearest the earth. Unfavorable oppositions come when it is near aphelion, or in the part of its orbit farthest from the sun at that time. The variation in the distance of the earth from the sun also has a slight effect upon the nearness of Mars to the earth at different oppositions, but this effect is small because the orbit of the earth is much more nearly circular than that of Mars.

The distance of the earth from the sun at perihelion, which occurs in January, is only about three million miles less than it is at aphelion, in July, when it is farthest from the sun.

The most favorable oppositions of Mars occur at intervals of fifteen or seventeen years. The last favorable opposition occurred in 1939. It was not as favorable, however, as the opposition that occurred in August, 1924. Then the planet was at its closest possible approach of around 34,500,000 miles, and was a more brilliant object than Jupiter. The next favorable opposition of Mars will be on September 10, 1956. At an average opposition the distance of Mars from the earth is about 48,500,000 miles. This year's opposition of Mars is a little less than average in the advantages it offers for observation of the surface of this interesting neighboring world. Usually observations of the surface features of Mars, whether visual or photographic, are made telescopically only for periods of two months or so before and after the date of opposition.

Even when one observes it with a *small* telescope around the time of the more favorable oppositions, the Martian surface shows many interesting features. Since the atmosphere of Mars is very thin one may see through it to the surface of the planet. The disturbing effect of the unsteadiness of the earth's atmosphere, which increases as higher magnifying powers are used, interferes with observation of the great wealth of fine detail in the surface markings that have been glimpsed in moments of exceptionally fine seeing. In general, moderate-sized telescopes have been found to yield the best results in observations of many of the surface markings on Mars.

The most characteristic features of the Martian surface include the large, reddish-ochre areas that cover about six-tenths of the surface of the planet and are believed to be vast desert regions, the white polar caps, which vary in size with seasonal changes on the planet, and the permanent dark markings, which lie chiefly in the tropical regions and southern hemisphere of the planet and form a dark belt around it. The dark markings show great seasonal changes. As the white polar cap shrinks in size in the summer hemisphere, the dark areas deepen in color and intensity and assume various shades of blue-green and green, such as they would with the growth of vegetation. As autumn advances in that hemisphere the greens of the summer season are gradually replaced by browns. It is believed that these seasonal changes of the dark markings, following the gradual shrinking and apparent melting of the polar cap, are due to the growth of vegetation on the planet, although not necessarily of a high type. It has been suggested that the vegetational growth in these dark regions consists chiefly of hardy mosses and lichens,

although this has not been definitely proved.

The network of fine dark lines that many observers have glimpsed on the planet at various times, called canals, and quite generally believed to be strips of vegetation bordering waterways, are among the most interesting and controversial of all the Martian features. From the days of the Italian astronomer, Schiaparelli, and Lowell, to the present time, the canals of Mars have been seen, described, drawn, and finally photographed by so many observers that early scepticism has

been replaced by wide acceptance of these markings as real surface features. Many of the Martian canals meet in, or cross, dark, round areas named "oases" by early observers. The canals are observed crossing dark regions, as well as the extensive desert tracts. Like the large, dark, equatorial regions, they show seasonal dark-

ening following the melting of the polar caps.

The polar caps of Mars are known to have very little depth. They increase rapidly in size with the approach of winter and dwindle in size as rapidly with the advance of spring. When a cap is largest, in winter of its hemisphere, it may extend halfway or more from pole to equator. The northern polar cap never quite disappears, although the southern cap sometimes does near the end of summer in the southern hemisphere. Haze and fog appear to form frequently over the polar caps, and also form over other parts of the surface; clouds, and vast dust storms over the reddish desert areas, are phenomena frequently observable at the Martian surface.

Although free oxygen and water vapor have not been detected through series of spectroscopic observations made on Mt. Wilson, studies made by Dr. G. P. Kuiper at the McDonald Observatory, in Texas, have shown that carbon dioxide is twice as abundant in the atmosphere of Mars as it is in the earth's atmosphere. It is certain, however, that water vapor and oxygen on Mars must occur in such small amounts, and other conditions be such, that animal life such as is known on earth could not exist there. The atmosphere of Mars is much thinner than that of the earth, and the extremes of temperature between day and night much greater, although the temperature near the planet's equator at noon has been found, through measurements, to be about that of a clear, cool, spring day on earth.

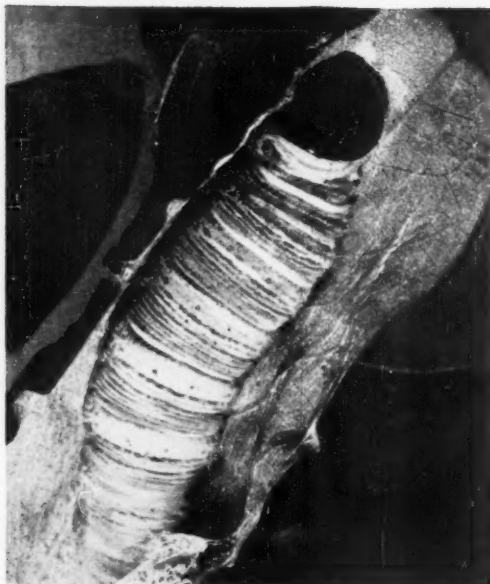
In some ways Mars is more similar to our own planet than any other. It is, moreover, with the possible exception of Venus, the only planet that could possibly support any form of life. For one reason or another all other planets would be ruled out, as well as the moon.

Mars rotates on its axis in 24 hrs., 37 min., 22.6 secs., which differs very little from the rotation period of the earth. Even in a short period of observation of the surface markings of the planet the fact that it is rotating is clearly seen. The exact (Continued on page 218)

Orion

By MABEL C. SATTERTHWAITE

Exultant pride the rich man feels at sight
Of costly master paintings on his wall.
Orion hangs upon my sky at night
Done by the greatest Master of them all.



Skipper Caterpillar—Housing Expert

By
GEORGE A. SMITH

THE caterpillar of the silver-spotted skipper butterfly, both shown above, has solved its housing problem by using leaves for building material. In constructing a dwelling place, it fastens several leaves together with strands of silk so that it will have a safe retreat while resting or molting. The caterpillar generally remains in its house during the day and comes out at night to feed.

As the caterpillar molts and grows bigger, it leaves its old home and quickly constructs a new and larger one to accommodate its increased size. When an empty house is found it is an indication that the skipper has moved to a new location. But whether or not the house of a skipper caterpillar is occupied at the time of examination, it is always as clean as the house of a Dutch housewife.

The caterpillar is recognized by its yellow-green body and its large, reddish-brown head attached to a small neck. It has two false eye spots on its head, which

probably help to scare away natural enemies of the caterpillar. It usually feeds and builds its dwellings among locust leaves. After reaching maturity the caterpillar spins a few layers of silk around its body and then goes into the pupa stage. There are usually two broods of caterpillars in a season. The pupas from the second brood winter over until spring before the adult butterflies emerge.

The silver-spotted skipper butterfly is the best known member of the skipper family of a thousand or more species. Its wings are a dark chocolate brown with a row of yellow spots across the front wings. The chief identification mark is the irregular silver-white spot on the under side of each hind wing. The silver spot has a quick, dart-like flight, which produces a low pitched buzzing sound. Because of the peculiar flight of this butterfly, which is characteristic for the most part of the other members of the family, all are commonly called skippers.

Spring What-Nots

By RUTH MINERVA SCHULTZ

(In The River Willows)

I found a treasure
In the willows
Some jewels. . .no. . .
Rich amber glow. . .
Of lost gold, riding billows?
I found a treasure,

Can't you guess
With Springtime all around?
Here in a crotch
Of willow notch. . .
A wee nest, snugly bound,
And three eggs hatching sound!

An Insulated Birdhouse

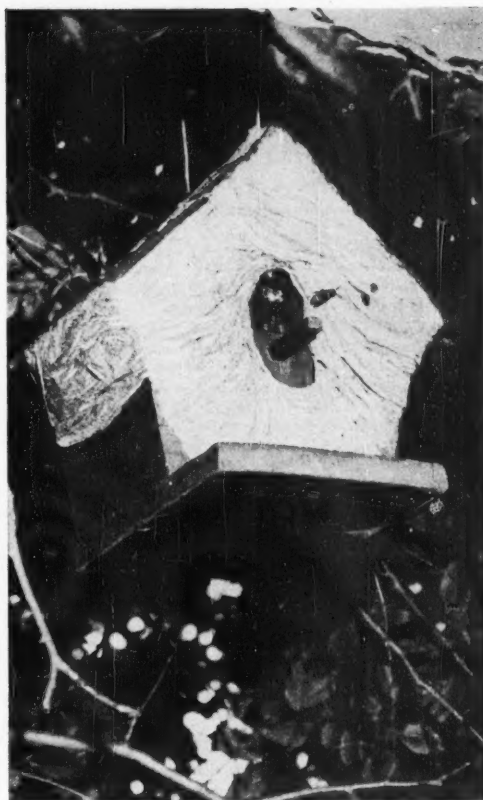
By TESSELAAR L. de WET

IN Winnipeg, the metropolis of Canada's broad prairieland, the thermometer, in winter, frequently drops to thirty below zero. Temperatures of 40° and 50° below zero are not unknown. To protect the residents of the homes they plan, Canada's architects must necessarily specify, before their diagrams leave the drawing boards, that the buildings they have designed must be insulated with rock-wool, fiber board, asbestos, shavings, or some other accepted type of material, as protection against the severe winter weather.

In the late autumn of 1949 a Winnipeg resident built a small but adequate birdhouse, using boards salvaged from an old apple box. He gave it a coating of oak varnish, then left it outside, in his garden, to take on a weather-beaten appearance during the winter. Early in the spring the nest box was hung from a sturdy branch of a tree to await the return of the birds from the sunny southland. The birds returned to the garden, but on attempting to build in the house provided for them, found it occupied by a colony of wasps. The insects started their own paper nest inside the house, and later covered the outside walls. As the work went on, the ever-busy wasps, as is their way, resisted any and all efforts to dispossess them. Even their landlord, discreet rather than valorous, made no effort to assist the would-be bird tenants to set up housekeeping in the home he had so thoughtfully provided.

When your photographer's flash bulb lit up the shadows under the leafy tree (early in September) the front wall of the house and the two side walls were half covered by the efficient wasps, and the rear wall was about one third finished. Work was progressing, as far as could be ascertained, right on schedule.

Within a few weeks, there will be snow on the streets of Winnipeg. Blinding blizzards will blast into the city from the northern wastes of Canada, ear muffs will replace sun glasses, nylons will go into bottom



drawers, while woolen togs will be laundered to rid them of the odor of moth flakes. Big rotary snow plows will knife along the avenues, skis will be waxed, snowshoes will come down from attics and garrets, while whiskery old timers will tell bored listeners that "it ain't nowhere near as cold as it was in '98". The birds, except for a few shivering English sparrows and some hardy visitors from the far North, will have left the prairies, not to be seen again until next spring.



Vignette

By GERHARD FRIEDRICH

We stopped and gazed; neatly strung out
Along the gentlest crest of a green hill
We counted thirteen deer — bucks, does, and fawns.
They made an unassuming silhouette,

Yet were perhaps the true sophisticates.
We stopped and gazed: they deigned to do the same,
Serene and with but half-expectancy.
And so, one windy morning in Vermont,

The God was worshipped.

The School Page

By E. LAURENCE PALMER

Professor of Nature and Science Education, Cornell University, and Director of Nature Education. The American Nature Association.

NATURE MAGAZINE'S SPECIAL INSERTS

THE October, 1938, issue of *Nature Magazine* initiated the series of articles that has come to be known as the "Special Insert" series. Printed in the center of the magazine, on special paper, it has been removable for special binding, and has been planned to avoid duplication and yet to give wide coverage of the fields of Nature thought to be of interest to the readers of *Nature Magazine*. No unit has been published that has not stimulated some special correspondence, and, while most of this comes immediately after the publication of an insert, some has come years after the article first appeared.

In the March, 1951, issue of *Nature Magazine* our insert on twigs was known as the 65th of the series, although actually seventy-one articles have appeared. Some of these were shorter than normal and appeared during the shortages brought on by World War II. Since the next issue will contain the insert listed as the 66th, it may be appropriate at this time to look forward and backward regarding the series, and to seek some guidance from the readers as to where we may go from here.

The units of the series have been of two essential types, or possibly three, or even four, may be recognized. Such units as the ones on sounds, age, water-levels, survival techniques and tracking are general in nature. Those on fibers, foods, galls, and wood have been more or less economic in their approach, although there is hardly a strict definition. Certainly some such as the units on deserts, waste places, marshes and pond surfaces have been ecological. A great majority of the units have been based more or less on taxonomic units. We have had stars, minerals, reptiles, amphibians, fishes, birds, mammals, woody plants, fungi and herbs in various classifications. This variety has been provided to avoid the danger of monotony. It has been a deliberate planning. Now what should we do in the future?

Copies of 57 of the 66 inserts are still available from the American Nature Association. Numbers 3, 30, 32, 40, 42, 44, 46, 53, 54, are out of print. Single copies are available at 20 cents each; 15 cents each for 10 to 49 copies; 10 cents each for 50 to 99 copies; five cents each for 100 or more copies, as long as the supply lasts.

As hitherto published, the series covers the following topics:

1. Common Fresh-water Insects.
2. Weeds Above the Snow.
3. The Sky at Night.
4. Some Common Reptiles.
5. Common Food and Game Fishes.
6. Rocks and Minerals.
7. Domestic Mammals.
8. Common Marine Animals.
9. Upland Game Birds and Water-fowl.
10. Atlantic and Gulf Coast Shells.
11. Nuts.
12. Fur-bearers.
13. Deserts.
14. Marshes.
15. Weed Patches and Waste Places.
16. Fruit Store Plants.
17. Circus and Zoo Animals.
18. Root Crops.
19. Hawks and Owls.
20. Ferns.
21. Fall Garden Flowers.
22. Spiders.
23. Sounds.
24. Western Birds.
25. Living Out.
26. Fibers.
27. Evergreens.
28. Herb Gardens.
29. Star Chart.
30. Amphibians.
31. Cereals.
32. Eastern Song Birds.
33. Ornamental Trees.
34. Pacific Coast Shells.
35. Mushrooms.
36. Insect Pests.
37. Animal Tracks.
38. Seaweeds.
39. Spring Flowers.
40. Shore Birds.
41. Butterflies and Moths.
42. Cactuses.
43. Liverworts, Mosses and Allies.
44. Warblers.
45. Galls.
46. Age.
47. Poultry.
48. Grasshoppers and Kin.
49. Spring Flower Gardens.
50. Beetles.
51. Flies.
52. Christmas Plants.
53. Cage Birds.
54. Wood.
55. Formulae.
56. Pond-surface Plants.
57. Sparrows.
58. Poisonous Plants.

59. Land Shells. 60. Water Level. 61. Flavors and Scents. 62. Sea Birds. 63. House Plants. 64. Dogs. 65. Winter Buds and Twigs.

Insert number 66 will deal with bats, shrews and moles. During the war period small inserts were published on these topics, which presumably should not be considered again — snow, ice, edible weeds, peat bogs, clovers, mice.

Now the question is: Which of these units have been most valuable, particularly to teachers, who, we hope, are readers of the school page? Probably the three that have brought the greatest response so far have been the units on fall garden flowers, tracks and water-levels.

It would be most helpful if readers of this page would drop me a postcard, addressed to E. L. Palmer, Farnow Hall, Ithaca, New York, indicating simply by number the five inserts that have so far been found to be most useful. You might add to your vote the total number of inserts with which you are acquainted, so that we may have some idea as to whether you know most of them or just happen to know a few.

Now the question arises as to where do we go from here? With no thought of committing the page to any plan, but simply to feel you out, will you add to the numbers appearing on your card indicating which published inserts you like best, the letters in the following list that you think most likely to offer appeal to you or to your students. We would like to hear from you whether you are a school person or not. Please select the five suggestions for future articles that appeal to you most and then, if you wish, add a few of your own, which may not be included in the list.

Here are the topics suggested for future inserts:

- A. Orientation by sun, moon, stars, snow, plants, animals, machines.
- B. How Much and How Many? Companion article to one on age.
- C. Scats, Droppings and Signs. Companion to track unit.
- D. Sane Traps, Blinds and Cages for Observing Living Animals without Harm.
- E. Furs.
- F. Clouds and Weather.
- G. Historic Geology.
- H. Physiography — Hills, Lakes, Rivers.
- I. Fish Bait.
- J. Bark of Trees.
- K. The Aquarium.
- L. Feeding Stations.
- M. Nest Boxes.
- N. Fresh-water Algae.
- O. Lichens.
- P. Bugs.
- Q. Wasps, Ants and Kin.
- R. Gems.
- S. Marine Fishes.
- T. Marine Mammals. Companion to Sea Birds.
- U. More Birds.
- V. More Mammals.
- W. More Insects.
- X. More ecological units.
- Y. More earth, science units, including star study and the planets.
- Z. Some physical science units.

Just drop me a card with five numbers on it. Add five letters expressing your choice for future articles. Then, if you wish, add five suggestions of your own. This is a democratic page and we want your help. We will try to give it to you if you will let us know.

Just Look

Protection for the millions of visitors to those national parks which contain large wild animals is the reason for a new regulation approved by Secretary of the Interior Oscar L. Chapman. The regulation prohibits the "feeding, touching, teasing or molesting of any bear, deer, moose, buffalo (bison), bighorn (mountain sheep), elk, or antelope."

In recommending departmental approval, the National Park Service called attention to the fact that some visitors have the erroneous belief that animals found in the national parks are tame and can be handled as pets, and it emphasized the possibility of attack, without apparent provocation, upon any nearby person, often with harmful results.

"There are instances too numerous to mention," says the Service, "where supposedly 'tame' wild animals turned on their benefactors. More than one deer raised from a fawn has trampled or gored its owner to death."

Previously, the limitations, now applied to other large wild animal species, have been applied only to bears, which continue to present the principal problem of public safety as far as the wild animals of the parks are concerned. Personal injuries to park visitors, resulting from undue familiarity with bears, have always been more numerous than for other species. However, all those listed are potentially dangerous, and all have at one time or another caused injury to persons who failed to realize, or refused to believe, that they should be wary in approaching them.

Geology's Giants

Giants of Geology. By Carroll Lane Fenton and Mildred Adams Fenton. New York. 1952. Doubleday and Company. 333 pages. Illustrated. \$3.50.

This readable, valuable and informative book about great geologists, from Abraham Gottlob Werner to Thomas Chrowder Chamberlin is a revised and much enlarged edition of the authors' *The Story of the Great Geologists*, published in 1945. The Fentons are, themselves, geologists of renown, and their outstanding writings in this field stand out because of their achievement in popularizing the study of this fascinating subject. Where their previous books have dealt with the facts and fascinations of geology, this one brings in the personalities; the men, who have, through the years, carried forward the studies in this field. The book is, therefore, a history of geological knowledge as seen through the lives of the most notable contributors to that knowledge.

Australian Films

From the Australian News and Information Bureau, 636 Fifth Avenue, New York 20, New York, comes a catalog of Australian films that are available for rent or purchase. A number of these films are of

special interest to those interested in Nature, as might be expected of films dealing with a country boasting such varied fauna and flora. "Bushland Color Studies," for example, presents many of Australia's unique animals in color, and "Fine Feathers" does the same for bird life. There are several other unique Nature reels, and a copy of the catalog may be had on request to the address above.

To Carolina

Carolina Quest. By Richard M. Saunders. Toronto, Canada and Columbia, S.C. 1951. University of Toronto Press and University of Southern California Press. 119 pages, with wood engravings by Sylvia Hahn. \$3.50.

The author of this delightful book was one of two Canadian naturalists who visited South Carolina to get acquainted with its bird life. From the pages of this book one gathers that he fell in love with the State, its countryside and its people. Much of the bird life was new to him, and there was the thrill of discovery and the new acquaintances. The author is by vocation a professor of history, but by avocation and enthusiasm a student of the birds. He has the faculty of taking the reader along on his bird quests and sharing with him the joys involved.

Fight the Bugs

The time has come for an all-out fight against forest insects and diseases that are now an even greater menace to our timber supply than fire. Lyle F. Watts, Chief, U.S. Forest Service, states in his annual report. Mr. Watts insists that it is time for the Nation to take these losses seriously and he calls for a joint federal-state-private campaign against them.

In a report which recounts such progress as has been made in better forest management and in forest fire control, the Chief Forester points out that a study of one ten-year period showed timber damage from insects and disease, particularly in epidemic form, had caused an aggregate loss of 622 million cubic feet of timber — one-third greater than the fire loss. This means the annual destruction by pests of tens of millions of board feet of lumber and other valuable forest products vital to national defense, housing, industry and the normal incomes of woodlot and forest owners.

The East is highly vulnerable to a host of these insect-disease attacks, many existing in a sub-acute or endemic form, but constantly threatening to erupt into devastating epidemics. Among them are such well-known pests as the spruce budworm in New England, many types of leaf "miners" and the pine tip moth found in central Atlantic and other states. The white pine blister rust has been kept under control for nearly two decades by strong control measures, but another disease, "oak wilt," encroaching from the midwest, is seriously threatening the hardwood forests of the central coastal area.



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Camera Trails

By
EDNA HOFFMAN EVANS

THE photographer's pup leads a dog's life.

That is a nice, catchy way to start this section — but I do not believe a word of it. I think my pup enjoys being a photographer's dog. At any rate, she certainly enjoys going along on picture-taking expeditions. She has trotted at my heels up mountain slopes and down again, has picked her way through cactus patches, has enjoyed sniffing strange scents at the seashore. She has tramped with me through shady woodlands, and occasionally has even frisked about happily in the snow. When she gets tired she begs for a lift and I pick her up (she weighs just five pounds) and carry her along with the rest of the photographic paraphernalia.

My dog has learned to be a model, too. At least I think she knows when I am getting ready to take her picture. Whenever that happens, she sits down. Sometimes she even lies down. I am sure she does that because she knows from experience that I will fiddle and focus indefinitely before I finally take the picture. Wise little dog. She is not going to stand around all that time just waiting for me.

With coaxing, however, she will consent to do what I ask. It is just a matter of getting her to understand what I want her to do. My dog is no different from most dogs. With few exceptions, they all want to cooperate with people they like. If they can please a camera-happy owner by posing for a photograph, pose they will, to the best of their canine ability.

Photographing one's own dog is one situation. Posing someone else's dog is something else again. The principles involved are the same — it is chiefly a matter of great patience, of winning the dog's confidence, of not confusing him, or frightening him, or making him feel that he is being abused, threatened, or punished.

An intelligent and understanding human helper is invaluable to the cameraman in many instances, and dog photography is no exception. This helper can keep the dog amused, located properly in relation to camera and background, can coax it to look this way or that. The photographer, meanwhile, is able to devote all his attention to taking the photograph.

You notice that I specified an "intelligent and understanding helper." Some people, some dog owners to be specific, have absolutely no idea of how to persuade a pet to pose. Their line of patter runs something like this:

"Here, Fido. . . Sit up. . . Here. . . No



Dogs must be friendly with each other before they can be posed together successfully.

. . . Don't do that. . . Come on. . . Sit up. . . Nice doggie. . . No. . . Yes. . . Sit up. . . Get down. . . That's a good dog. . . No. . . Here. . . Come here, Fido. . . Bad dog. . . Aren't you ashamed. . . Sit up. . . Why don't you do as I say. . . Come here. . . Pose for the nice lady. . . Here, Fido, here. . ."

And so it goes until Fido's ears are drooping, his tail is tucked between his legs, and he is a completely bewildered, unhappy dog. In fact, he is almost a canine nervous wreck. The photographer's nerves are not in very good repair after such a session, either. When something like that happens, you might as well close up the camera and go home. Fido will do no posing that day. In fact, he may never pose. The next time he sees you coming he may run and hide under the barn. Either that, or he may try to take a nip out of your ankle. And can you honestly blame him?

There is a vast difference between a dog

snapshot and a dog portrait. A dog snapshot has a dog in it, but it also contains a great deal of material that has no real relation to the dog. It tells no story, it shows no character, it has no personality. A dog portrait, on the other hand, can be just as much of a pictorial character sketch as any other kind of a portrait can be.

The best collection of dog portraits that I know of is to be found in the book *Gallery of American Dogs*, written by Harry Miller and beautifully illustrated with 120 photographs by Arthur S. and Katherine Holt Mawhinney. It was published in 1950 by McGraw-Hill. I recommend it heartily to everyone who likes dogs and dog photography.

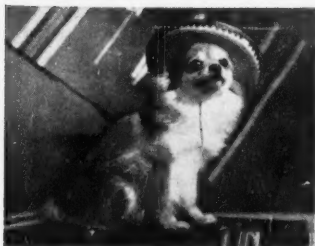
To quote directly from the photographic information given at the end of the book: "The Mawhinney technique is simplicity reduced to the nth degree, although the less experienced photographer is likely to find that there is more to his system than meets the eye. The standard background is an old gray blanket that is never folded and therefore shows no creases. It hangs on any convenient support and is placed nearer or farther from the model to make it lighter or darker in the picture. It may be four or fourteen feet behind the camera."

To take his dog portraits, Mawhinney used a Leica equipped with a 90mm lens, and one flash bulb in attached synchronizer. His exposures varied at times, but the usual combination was 1/100 second at f/6.3, with a press 40 flash bulb about six feet from the model. And to show that dog photography is not a thing of the moment, the photographer spent a dozen years (spare time) collecting the pictures.

A portrait should reveal something of each dog's personality. Pert little dogs can be shown looking directly at the camera. More reserved larger ones may be shown in profile. Pug-nosed dogs photograph well head-on. Long-nosed dogs,



"Props" to show the relative size of a poodle pup.



In this picture the dog is being unhappily patient.



In this picture the dog is being just plain miserable.

where there is considerable distance between nose-tip and eyes, are better shown in side view, or at about three-quarter view.

Of course it is more work to take a dog portrait than it is to take a dog snapshot. It takes more patience, more skill, more imagination, and more artistry. But the results are worth all the extras.

There are several important things to bear in mind in dog portraiture. First, the dog and the camera should be on the same level. When you shoot down on a dog, you distort the picture. The head looks too big and the legs too short. The hind quarters taper off unnaturally. So, either lift the dog or lower the camera to the same level.

Second, the focus should always be on the eyes. Usually there is enough depth of field to take in the nose before and the ears behind. Even a slight fuzziness of nose or ears may be acceptable — but the eyes must be sharp.

William Deo Paul, writing on "Dog Photography" in volume four of the *Encyclopedia of Photography*, lists some additional suggestions for the amateur in taking dog pictures. They are:

1. Be sure the dog's mouth is closed — his expression is better that way.
2. Use a high shutter speed.
3. Get that sparkle of interest in his eye.
4. Watch the lighting on his coat.
5. Do not let the dog get bored. Let him run around between shots.
6. Use a background that contrasts with the dog's coat.

I am not sure that I agree with all these suggestions. Sometimes the "smile" on a dog's face when he is panting is quite natural and appealing. "High" shutter speed is also debatable. It depends on the dog. Dogs can make sudden and unexpected moves that can be stopped only by a fairly fast shutter speed — 1/100 and 1/200 are recommended. However, a dog that knows and trusts you will pose for a much slower exposure. This will allow much greater lens stoppage and the resulting detail and depth of field.

To get the sparkle of attention, the photographer can whistle or make strange noises, provided he does not frighten the dog in the process. Other people, or even other animals, can help in getting the subject's attention, but they also may dis-

tract him so much that he stops posing altogether.

Watch for unwanted reflections, particularly from the eyes, or from wet noses and muzzles. These reflections are particularly undesirable in all-black or all-white dogs. Incidentally, an all-black or an all-white dog is a particularly difficult model; without proper lighting he is nothing but a silhouette with no detail at all to his coat. When photographing white dogs, be sure to wipe away any discolored secretions at the corners of the eyes.

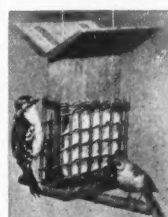
Dog pictures are given three general classifications. The first is *appeal* — "human" interest pictures that tell a story. They tug at the heart strings or tickle the funny bone. Second classification is that of *action*. Pictures in this group show the dog at work, perhaps herding sheep, in the field, or, in the case of seeing-eye dogs, serving as guides for sightless masters. Third is the classification called *stance*. Pictures in this group are usually taken at dog shows or exhibitions. The particular points of a breed are stressed; the "right" position of head and tail, proper sweep of flanks, correct grooming. Models for this group come from the prima donnas of the canine show world.

Backgrounds in dog portraits are extremely important. They may be so unobtrusive that the person who views the finished picture is scarcely aware that the background exists. At the same time the background must bring out the texture of the coat, and should be of such a tone value as to give contrast to the dog's color.

Sometimes it is difficult to tell just how a dog will show up against a background. My dog is orange colored, with a very light tan ruff. For a long time I tried photographing her against a white background, with rather unsatisfactory results. When I shifted to a dark brown background, the results were much better.

Posing one dog is enough of a problem. Posing two or more dogs makes the photographer's headaches multiply rapidly. In the first place, the dogs have to be friendly. They have to be sufficiently accustomed to each other to pose amicably. One should never try to photograph two strange dogs together; you may get an action shot, but never a portrait.

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And still another word of advice about dog photography. If you want to be sure of a good picture, do not stop after the first exposure. Take several; take a whole roll. As in many phases of Nature photography, there is a large element of luck, plus a great many possibilities for failure. You have a much better chance of a good picture out of eight or ten tries than you do out of one or two.

Unlike the photographer of human beings, the dog photographer cannot tell his model to smile, or to look at the birdie; to moisten the lips, or to tilt the head just a little. Instead, he must do what he can to bring about the pose he desires. Once all the camera adjustments are made, the photographer must be prepared to release the shutter at just the proper instant. One second too soon or too late and the pose is not right. Once the opportunity is missed, the photographer must wait patiently until the circumstances are right again.

Now some words about "props" and additional stage essentials.

I am heartily opposed to "dressed-up" animal models. Nothing looks more miserable than a puppy or a grown dog in doll clothes. It is an outright injury to the animal's self respect.

With such a conviction, I have no excuse to offer for the pictures of my dog in her Mexican sombrero. I bought the little hat (and a neat job it is) at a gift shop just across the border in Old Mexico. I knew my dog would hate it, and she did, from the first moment I tried to put it on her. In fact, she nipped my finger just to show me how she felt about it.

None the less, I rigged up some lights, arranged a couple of serapes as background, and took her picture, hat and all. A rubber hand held the hat on; she would never have consented to wear it otherwise. The two poses show her feelings toward that sombrero. In one she is being unhappily patient. In the other she is being just plain miserable. I do not think I will ask her to pose in the sombrero again.

In the case of very small puppies, some method of measurement is necessary. Favorite "props" are tea cups, mugs, owners' hands — anything to show relative size. In the case of the poodle pup shown here, a western boot gives both contrast to his white hair and indicates his size (or lack of it).

Dog portraiture can be mighty interesting. Some photographers make a special business of it. They follow the dog shows, photograph the champions, near-champions, and the ones whose owners think they are champions regardless of the judges' opinions.

Dog shows do give excellent opportunity to the photographer because of the many different breeds available as models. But, before tackling the dog shows, practice on your own pet at home. Go at it right and you will have a willing, cooperative model. You may also get some excellent portraits of one of your very best friends.

MARS RETURNS TO OPPOSITION

(Continued from page 211)

period of rotation can be exactly determined from observation of these fixed surface features, as it can be for any planet with permanent markings on its surface. Since the equator of Mars is tipped to the plane of its orbit at nearly the same angle that the earth's equator is tipped to the plane of its orbit, the seasonal changes of the planets are, geometrically, nearly the same. But as the Martian year is only about one and a half months less in length than two of our years, the Martian seasons are nearly twice as long as our own. In size Mars is much smaller than the earth. Its diameter is about 4200 miles as compared to the earth's diameter of about 7900 miles. Its surface area, then, is not much more than one-fourth and its volume about fifteen-hundredths that of the earth. Its mass is a little more than one-tenth the mass of the earth and its surface gravity is only thirty-eight hundredths that of our own planet. It follows that a man weighing 200 pounds on the earth would weigh only 76 pounds on Mars.

The two tiny satellites of Mars, Phobos and Deimos, do not exceed ten miles in diameter. The brighter of the two, Phobos, and also the larger, is a most remarkable little body. It revolves around Mars at a distance of about 3700 miles from its surface in less than one-third of the time that it takes Mars to rotate on its axis. As a result, as seen from the surface of Mars, it rises in the west and sets in the east. Deimos is probably not more than five miles in diameter, and takes more than 30 hours to make one revolution around Mars at a distance of about 14,600 miles from its center. These little bodies are seen with difficulty, except in large telescopes at close oppositions of Mars. They were easily seen, however, with the 26-inch equatorial of the U.S. Naval Observatory, at Washington, at the very close opposition of Mars in August, 1924. With this instrument they were discovered there by Prof. Asaph Hall at the close opposition of 1877.

At opposition this year Mars will be found in the constellation of Libra, close to the third magnitude star Alpha Librae. It retrogrades or moves westward during the entire month. It increases rapidly in brightness in April, and by the end of the month is almost exactly equal to Sirius in brightness, shining with unflickering, reddish light.

Mercury passes from the evening to the morning sky at inferior conjunction on April 5, and is poorly placed for observation all the month. Venus is still observable in the morning sky but low in the east at sunrise. Jupiter will be in conjunction with the sun on April 16, passing then to the morning sky. It will be too close to the sun to be seen this month. Saturn is in opposition to the sun on

April 1. It is west of Spica, in Virgo, and in fine position for observation throughout the night.

OLD NATURE IN A NEW JAPAN

(Continued from page 180)

above, Ome, there were families wandering the paths, and a young man standing with his back to a shrine, looking out over the sunmisted valley. Along the road leading up from Atami, the lovely, pine-fringed, seacoast village south of Tokoyo, a school group from a nearby city climbed slowly to the railway station after visiting the outstanding scenes of legend and natural beauty in the area. These are only a few of the many manifestations of a consuming interest in Nature that make themselves evident to any passerby in Japan.

Of course, the Japanese are avid travelers within their own country and fiercely proud of the abundant beauty their country boasts. In the past, such reverence and pride may have been occasioned by many considerations other than that of their simple, unconditional love of the outdoors. As the Western influence skims off more and more of the "social obligation" outlook from the philosophy of Japan, it is to be hoped and expected that the hard core and basis of this ramiform philosophy will be revealed — an honest and untrammelled regard of Nature itself.

Hunting Licenses

The sale of 12,660,993 hunting licenses during the fiscal year ended June 30, 1951, brought the 48 States an all-time high gross revenue from this source of \$37,840,791, according to a report to Secretary of the Interior Oscar L. Chapman by Albert M. Day, Director, Fish and Wildlife Service. The 1950-51 gross revenue exceeded by \$199,742 the 1949-50 total of \$37,641,049. The number of licenses issued in 1950-51 was greater by 23,192 than in the previous year when 12,637,801 license sales were recorded. The sale of 12,758,798 licenses in 1948-49, however, has not been topped.

Nonresident licenses numbering 212,254 were 15,598 higher in 1950-51 than the total of 196,656 in the previous year. Resident licenses increased by 7594.

Minnesota's gross income from hunting licenses was cut almost in half in 1950 because the State did not have an open season on deer during the fall of 1950. The 1949-50 revenue of \$1,238,043 dropped to 628,159 in 1950-51. The number of licenses sold dropped from 483,097 to 330,871.

Michigan, Pennsylvania, New York, Ohio, Illinois and California—in that order — still head the list.

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GENETICS AT BAR HARBOR

(Continued from page 190)

behavior. In a colony of cats attention is being given to the inheritance of such physical characteristics as bob-tails, extra toes and abnormal ears, also the Siamese color pattern and its relation to other coat colors. Through careful crossing, a Siamese with red points has already been produced. And a flock of goats, as well as several of the famous strains of inbred mice, afford the opportunity for the study of group behavior and the development of such traits as leadership and fighting.

From the mice an illuminating angle to the problem of mental health has been revealed. Two distinct populations of mice, each with a very different heritage, were selected. Raised in identical environments with a large amount of space, the groups have been allowed to form their own social systems. Startling, to say the least, are the results to date. One group has formed a society which might be described as the sociologist's dream-come-true. The members of this group are busy and happy; they get along well together; they produce numerous and healthy offspring. The other group, however, presents a different and dismal picture. Unstable is the only word for its social structure; its members fight and bicker constantly; their offspring are few and poor. The same environment, the same opportunities, but they have widely different inheritance and vastly different results!

To test the effect of frustration on fighting behavior, the Laboratory turned to the flock of goats. The goats were first graded as to aggressiveness. Then various feeding experiments were begun. Sometimes the food was scattered over their enclosure in liberal quantities. This made for less fighting; every goat had plenty of food and plenty of room in which to eat it without interfering with his neighbors. At other times the goats were kept without food till they got fairly hungry; they then were herded into a small pen from which two at a time were taken out and fed within sight of the still hungry remainder of the flock. But these pairs did not find eating conditions as easy as heretofore. The food was placed on a board only six inches square, or in a bucket into which only one goat could get his head.

The results were illuminating. Dominance was found to be a habit. Likewise subordination. Goats in the habit of throwing their weight around were more than ever belligerent. Goats who usually yielded still refused to fight for their rights, even when driven by hunger. As a general rule, older animals dominated over younger. And this was reflected in the pairings. A younger goat might turn submissively away from the food when driven off by an older comrade. Yet, when paired with a still younger goat over

whom he was accustomed to dominate, he would see to it that he got the lion's share. The scientists point out the apparent similarity to the man who takes out on his dog his employer's unfairness and the scolded child who beats up his younger brother. They suggest the possibility that, since aggression, judging from the goats, appears to be a habit, training may have its uses in promoting a peaceful society.

Dogs, goats and guinea pigs, rabbits, mice and cats, all work unwittingly at the Jackson Laboratory to further comprehension of animal makeup, a comprehension that may eventually help find the answer to human needs and human problems. And through the quiet efforts of the scientists the word "genetics" is translated from textbook terminology to a living hope for the future of the species known as *Homo sapiens*.

LISTEN TO THE MOCKINGBIRD

(Continued from page 183)

mockingbird is an individualist; he goes into battle alone. He does fight snakes, dive-bombing their eyes; he attacks hawks and crows that threaten his home and does not hesitate to dash into a tree-top filled with swearing bluejays.

Protection of the young may require courage beyond that necessary for attacking a cat. If the little birds are captured and caged and left within reach, the parents may continue to feed them.

Young mockingbirds are both precocious and clumsy, a double liability. By the time they are two weeks old they are out of the nest and fluttering from limb to limb. Many of them fall and cannot get on wing again; and, despite the challenging cries and sharp-beaked attacks of the watchful father on the enemies, a fallen bird seldom survives. On a comparative basis with common breeds of birds — say European sparrows and starlings — there are few mockingbirds. As in the show business, there are fewer stars than actors.

Seldom, if ever, do mockingbirds fight among themselves, for each respects the other's territory and mating arrangement. But if one singer were to encroach on another's domain he would probably find himself in battle. Workmen on the campus of the University of Texas happened to lean a window against a building so that it reflected like a mirror. This was in a mockingbird's territory, and when he glimpsed his own image he attacked with screaming fury and kept up the fight until the window was removed.

Of course, there has been argument as old as the Jamestown Colony over the correct operatic ability of the mockingbird and the nightingale. Thomas Jefferson took a persuasive stand on this question when he wrote: "I have heard the nightingale in all its perfection and I do not hesitate to pronounce that in America it would be deemed a bird of third rank only,

our mockingbird and fox-colored thrush [hermit thrush] being unquestionably superior to it."

So perhaps it is altogether fitting and proper for this air-born fluff of gray to be recognized as America's National Songbird. As he flies our skies, singing with the joy of the emancipated, he embodies the liberty-loving, courageous, self-reliant spirit of the men who started our country on its way. In all his cascade of song, serenading in the moonlight or sounding off to protect his family and domain, there is never a note of fear.

Never Winter

Where Winter Never Comes. By Marston Bates. New York. 1952. Charles Scribner's Sons. 310 pages. \$3.50.

After a Florida childhood and three years in Honduras and later years in Colombia, Marston Bates felt himself in debt to the Tropics for much happiness. Whenever possible he escaped from northern climates to go to the land "where winter never comes." This book is the result of his preoccupation with and affection for the tropical climes, about which he writes with charm, knowledge and enthusiasm. His objective is to give a picture of both man and Nature in the Tropics, and he succeeds in doing so in most fascinating and readable fashion. While his chapter on tropical diseases may not inspire one to risk exposure to them, it does indicate what to look out for if visiting the never-winter land. Dr. Bates also discusses different governments, tropical resources and all other pertinent phases of life in these regions.

An Arctic Year

Hudson's Bay Trader. By Lord Tweedsmuir. New York. 1952. W. W. Norton and Company. 195 pages. Illustrated. \$3.00.

This is a personal record in diary form of a year spent with the Eskimos at Cape Dorset in Baffin Land. It is a record of both excitement and contentment away from the stresses of the outside world.

Plant Physiology

Principles of Plant Physiology. By James Bonner and Arthur W. Galston. San Francisco. 1952. W. H. Freeman and Company. 509 pages. Illustrated by Evan L. Gillespie. \$5.50.

In writing this text the authors have assumed that the user will have a certain minimum background in basic science, such as an introductory course in chemistry and an elementary course in general botany. Thus they have discarded certain less important details in favor of facts and concepts central to an understanding of the functioning plant. Also recognizing the fading dividing line in modern biology between physiology and biochemistry, they have found it possible to approach the subject matter of this book in a simpler and more concrete manner that was earlier possible.

Migration

Wild Wings. By Frank S. Stuart. New York. 1952. McGraw-Hill Book Company. 222 pages. \$3.50.

Migration of waterfowl has always been a fascinating subject and a lovely sight to behold. Some derive pleasure from this migration because it brings birds within range of the waterfowler's gun. Others merely the flight of the birds as they move along their migratory paths. Mr. Stuart finds migration a challenge to his literary skill, and in this book weaves a story about the northward migration. In his earlier *City of the Bees*, charmingly written though it was, the author allowed his imagination to run away with him on occasion. In this present volume, also fascinating reading, he skirts perilously close to the edge of anthropomorphism, at least too close for the taste of some readers. In our opinion, however, although some systematic ornithologists may find something with which to quarrel, the value of this book in stimulating interest in and understanding of migratory waterfowl is paramount.

Reforestation Gains

Reforestation has hit its pre-war stride with 456,370 acres planted in fiscal year 1951, according to U.S. Forest Service figures. This brings the total acreage of reforested land in this country close to 7,700,000 acres, including planting by the Forest Service, Soil Conservation Service, Tennessee Valley Authority and the Department of Interior, as well as by States and private landowners.

Although 1951 tree planting showed a drop of 41,000 acres from the 1950 record, it surpassed the highest five-year average of 453,400 acres, established between 1937 and 1941 when the Civilian Conservation Corps and the Prairie States' shelterbelt programs were in full swing. The discontinuance of large-scale Federal planting and diminished growing of nursery stock during the War years cut tree planting almost in half between 1945 and 1949. Federal planting and nursery production are not yet up to pre-war levels.

Lyle F. Watts, chief of the Forest Service, believes the slight decrease in 1951 planting was caused, by a shortage of planting stock and does not reflect a waning public interest. State nurseries in 20 States reported that demand exceeded supply by a total of 60 million trees. These nurseries, cooperatively financed by State and Federal Forest Services, furnish trees at nominal cost to all private land owners.

To the Antarctic

Fourteen Men. By Arthur Scholes. New York. 1952. E. P. Dutton and Company. 314 pages. Illustrated with photographs and end maps. \$4.50.

This is the interesting chronicle of the expedition to Heard Island in the antarctic by fourteen members of an Australian ex-

pedition. The author was able to draw upon his own experiences as a member of the party and on the personal diaries of his thirteen companion adventurers. The result is an exciting story of hardship and thrill.

Wild Flowers

Illinois Wild Flowers. By John Voss and Virginia S. Eifert. Springfield, Illinois. 1951. Illinois State Museum. 256 pages. Illustrated. \$2.25.

The splendid pictures used to illustrate this popular guide to many Illinois wildflowers were taken by the late Dr. John Voss. They constitute a representative although not complete collection of pictures of the wild flowers of that State. The text has been prepared by Mrs. Eifert, a frequent contributor to the pages of *Nature Magazine*.

Pennsylvania Shrubs

The Shrubs of Pennsylvania. By William C. Grimm. Harrisburg, Pa. 1952. The Stackpole Company. 522 pages. Illustrated with black and white drawings. \$5.00.

This is a companion volume to the author's *The Trees of Pennsylvania*. Two simple sets of keys to shrub identification are provided, and the text has been kept as simple as possible with due regard to easy identification. About 150 shrubs are covered. It is a large book for home use.

On the Range

Range Management. By A. W. Sampson. New York. 1952. John Wiley and Sons. 570 pages. Illustrated. \$7.50.

This is the most comprehensive study in print of this relatively new science that is basic to an important phase of our conservation practices. Proper range management is vital to the West and thus to the nation as a whole. The author was a pioneer in this field and writes against a long background of practical experience and research. The book includes discussion of care and management of land, animals and timber.

Migration of Birds

Migration of Birds. By Frederick C. Lincoln. New York. 1952. Doubleday and Company. 102 pages. Illustrated. \$1.00.

Bird migration has always been one of the most fascinating phases of ornithology, holding its elements of mystery. Bird banding through the years has gradually shed light upon the travels of migratory birds as the seasons roll around. Several years ago Dr. Lincoln, of the U.S. Fish and Wildlife Service, wrote and had published a considerable volume entitled *The Migration of American Birds*. Now, in this small and inexpensive book, he presents, clearly and concisely, the story of migration. It is a welcome little volume.

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UNDER THE MICROSCOPE

By JULIAN D. CORRINGTON

BIOCENTENNIALS

Leonardo da Vinci (1452-1519)

"The Medici created and destroyed me."

(Continued from March)

He worked out the law of inertia, saying "The thing which moves will be so much the more difficult to stop as it is of greater weight." He experimented with shapes of objects that are to be driven through such fluid media as water or air and reached the completely modern finding that the front end should be blunt, the rear tapered; in other words, the teardrop, fusiform, or streamlined shape, which causes the least retardation from friction in front and the greatest push from behind. He understands the leverage obtained by the joints of the arm in throwing a stone, and how this mechanical advantage may be increased with a stick or sling. He writes at length on the density of the atmosphere and how this buoys up the bodies of birds and makes flight possible. In discussing the production of motion of an object, as a cannon ball, he takes into consideration the movement of the earth as compounding this motion, and anticipates the whole idea of relativity. This passage: "No element possesses weight within its sphere, and when by chance an element passes over into a lighter one it instantly creates gravity; and not being able to be supported there it falls back again into its own element, and there immediately this gravity dies," reads like a sentence in modern nuclear physics.

"Every weight tends to fall towards the center (of the earth) by the shortest way," and "The earth is moved from its position by the weight of a tiny bird resting upon it. The surface of the sphere of the water is moved by a tiny drop of water falling upon it," are sheer Newtonisms. He writes of falling bodies at considerable length, foreshadowing Galileo, and the following passage is a statement of one class of cases of the principle of least time: "Every heavy substance not held back out of its natural place desires to descend more by a direct line than by an arc. This is shown because every body whatever it may be; that is away from its natural place, which preserves it, desires to regain its first perfection in as brief a space of time as possible; and since the chord is described in a less time than the arc of the same chord it follows from this that every body which is away from its natural place desires to descend more speedily by

a chord than by an arc." This principle, credited to Pierre de Fermat, French mathematician of the Seventeenth Century, is considered by some to be the most fundamental concept in physics.

In astronomy, Leonardo writes at length on the moon and sun. He comes very close to Newton's universal law of gravitation in passages like this: "—if there were water in the moon, it would spoil the moon of itself, and would come to cover our earth, because in this moon the water would be above its air. Here the answer is that if there is water in the moon there is also earth there upon which this water supports itself, and consequently the other elements; and water is supported up there among the three other elements, as down here our water is among its accompanying elements; if however as the adversary holds the water had to fall from the moon, it would rather be that the moon would have to fall as being a body heavier than the water; therefore not falling it is a clear proof that the water up there and the earth are supported with their other elements just as the heavy and light elements down here are supported in space that is lighter than themselves."

He was the first to explain the partial illumination of the darker part of the moon's disc as due to earthshine: "The moon has no light of itself but so much of it as the sun sees, it illuminates. Of this illuminated part we see as much as faces us. And its night receives as much brightness as our waters lend it as they reflect upon it the image of the sun, which is mirrored in all those waters that face the sun and moon."

Most modern and striking of all his pronouncements in science are his discourses on paleontology. "Of creatures which have their bones on the outside, like cockles, snails, oysters — when the floods of the rivers which were turbid with fine mud deposited this upon the creatures which dwelt beneath the waters near the ocean borders, these creatures became embedded in this mud, and finding themselves entirely covered under a great weight of mud they were forced to perish—."

"In course of time the level of the sea became lower, and as the salt water flowed away this mud became changed into stone; and such of these shells as had lost their inhabitants became filled up in their stead with mud; and consequently during the process of change of all the surrounding mud into stone, this mud also which was within the frames of the half-opened shells, — became also itself changed into stone; —." He continues, describing "the creatures that have their bones within their skin" being covered with mud, decaying, and leaving their bones entombed in the subsequent rock. "Above the plains of Italy where now birds fly in flocks fishes were wont to wander in large shoals."

He has no patience for the "ignoramuses" who cannot read the facts of fossilization in the stratified rocks: "And

if you should say that these shells have been and still constantly are being created in such places as these by the nature of the locality and through the potency of the heavens in those spots, such an opinion cannot exist in brains possessed of any extensive powers of reasoning because the years of their growth are numbered upon the outer coverings of their shells; and both small and large ones may be seen, and these would not have grown without feeding or feed without movement, and here they would not be able to move." Again he brings keen discernment to bear in refutation of the then widely held belief that fossil remains were transported to their present sites by the Noachian flood: "If the Deluge had carried the shells for distances of three and four hundred miles from the sea it would have brought them with the various different species mixed up, all heaped up together; but even at such distances from the ocean we see the oysters all together and also the shell-fish and the cuttle-fish and all the other shells which stand together in companies, found all together dead, and the single shells are found one at a distance from another as we see them every day on the sea shores." "Sufficient for us is the testimony of things produced in the salt waters and now found again in the high mountains far from the seas."

Leonardo was a first-rate geologist. He described in vivid terms how the land was uplifted, then worn down by weathering and erosion; how rivers cut their valleys, often forming meanders; how they silt up marshes and deposit their load in an assorted manner upon reaching the sea: "When a river flows out from among mountains it deposits a great quantity of large stones in its gravelly bed, and these stones still retain some part of the angles and sides; and as it proceeds on its course it carries with it the lesser stones with angles more worn away, and so the larger stones become smaller; and farther on it deposits first coarse and then fine gravel, and after this big and then small shingle and after this follows sand at first coarse and then more fine; —". This sentence could well be an excerpt from a modern physical geography. And how is this, for a Fifteenth Century mind? — "The greatest river in the world is the Mediterranean, which is a river that moves from the source of the Nile to the Western Ocean." Or this one: "The water wears away the mountains and fills up the valleys, and if it had the power it would reduce the earth to a perfect sphere."

The genius of Florence understood the influence of sun and moon on the height of tides, the value of grass and roots in preventing soil erosion, and wrote at length on mathematics, water, atmosphere, the anatomy of the eye and the flight of birds. In the field of human anatomy he declared that he had dissected more than thirty cadavers. As early as 1489 he was planning a book on this subject, but it was not until the neighborhood of 1510 that most of his anatomical sketches were done. He

was unquestionably the foremost anatomist of his generation and had definitely taken a stand for original work as opposed to reliance on authority, but he missed being the Vesalius of history through his failure to organize, complete, and publish his work.

The statement is sometimes made that Leonardo knew that the blood circulated in the body because of certain comparisons with the circulation of water in nature. He is very explicit on the way in which the sun's heat evaporates water from the ocean, changing the liquid to water vapor, which condenses into clouds on meeting colder air; the clouds may then be blown over land and the particles of mist run together form rain drops, which then fall upon the land and run off through brook and river to the sea, completing the circulation. He further understands how veins in the rocks contain ground water that may be present as a water table even at high elevations. Then we find this passage: "Water which serves as the vital humor of the arid earth and for this same cause moves through the spreading veins, is poured into it and works within it as does the blood in human bodies. The same cause moves the water through its spreading veins as that which moves the blood in the human species, and as through the burst veins in the top of a man the blood from below issues forth, so through the burst veins in the summits of the mountains the waters from below are poured out." This is getting close, but it is not the final essence of the idea of circulation. He was Harvey's forerunner, but lacked the correct conception of either arteries or the passage of blood from artery to vein and hence of circulation.

It is also said that he could have been the Copernicus of science history had he published his astronomical findings. But though he stated that the sun did not move ("il sole no si muove"), he did not achieve the full concept of a heliocentric system. With greater justification it can be claimed that he anticipated Sir Francis Bacon, who wrote of how society was to be reorganized through universal adoption of the scientific method. Bacon was strictly an armchair expert, telling others how to go about making experiments and drawing conclusions, without doing so himself; Leonardo not only outlined or drew plans for a very large number of specific experiments, he actually performed a great many himself, described a whole series of inventions (including such modern appliances as an alarm clock and a ditch-digging machine!), and made predictions of the outcome of this method in the future. As is now well known he described the prototypes of nearly all modern weapons of war — the airplane; submarine, tank, poison gas, and gas mask to protect should the enemy use lethal fumes. He hated war, yet believed in strong defensive preparations.

He was much interested in the measurement of time. In a mathematical section he had written: "Every continuous quan-

tity is divisible to infinity," and showed that he regarded time as such a quantity. "Cause an hour to be divided into three thousand parts, and this you will do by means of a clock by making the pendulum lighter or heavier," is a prophetic statement to read in Leonardo's manuscripts when it is known that the pendulum clock was invented by Huygens in 1673.

That Leonardo himself appreciated the necessity for his abandonment of authoritarianism he frequently attested: "Whoever appeals to authority applies not his intellect but his memory." "While nature begins with the cause and ends with the experiment, we must nevertheless pursue the opposite plan, beginning with the experiment and by means of it investigating the cause."

In optics, the great Florentine tells of looking at the moon through a lens (though not a telescope), how to observe the sun in eclipse, writes about reflection and refraction, and is especially detailed in explaining both the construction and operation of a *camera obscura* — a small opening in the wall of a building leading into a dark room so that inverted images of external objects are received upon a white wall or sheet of paper. He compares this device with the human eye, and proves that the image formed in the eye must be inverted, and therefore this image must be reinverted in the visual center of the brain.

One of Leonardo's closest friends was the celebrated mathematician, Luca Pacioli. The painter assisted in designing illustrations for Pacioli's *De Divina Proportione*, and worked with the mathematician on arithmetic and geometry. Leonardo is not known to have contributed anything new in this field, although he apparently mastered everything Pacioli could offer. Two quotations will suffice to show the importance he attached to this subject: "No human investigation can call itself true science, unless it comes through mathematical demonstration." And "He who scorns the certainty of mathematics will not be able to silence sophistical theories which end only in a war of words."

In biology Leonardo was clearly the most learned man of his era. Not only did he have the most exact comprehension of human anatomy before Vesalius and of fossils and the fossilization process, but his writings attest a knowledge that ramified into many other channels. In comparative anatomy he had evidently planned a separate volume, many of his notes pointing out things that he should do later, such as "Write of the varieties of the intestines of the human species, apes, and such like; then of the differences that are found in the leonine species, then the bovine and lastly in birds; and make this description in the form of a discourse." "Then you shall make a discourse on the hands of each animal in order to show how they vary." "Describe the tongue of the woodpecker and the jaw of the crocodile." Of more or less completed sections, those

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on the eye, arm and leg muscles, and equine anatomy are most notable.

In physiology, Leonardo gives an excellent and reasonably complete account of external respiration, especially when we consider that oxygen was still 300 years in limbo. He described how the intercostal muscles raise the thorax, the wall of the lung following; then, as nature will not tolerate a vacuum, air rushes in to fill the enlarged space thus formed; the diaphragm reverses the act, expelling air from the lungs.

He was scornful of the physicians of his day: "Every man desires to acquire wealth in order that he may give it to the doctors, the destroyers of life; therefore they ought to be rich." "Strive to preserve your health; and in this you will the better succeed in proportion as you keep clear of the physicians, for their drugs are a kind of alchemy concerning which there are no fewer books than there are medicines." "Make them give you their diagnosis and treatment — and you will see that men are chosen as physicians for diseases which they do not know." These opinions were probably justified, but at any rate he held the Hippocratic aim in high esteem: "You know that medicines when well used restore health to the sick: they will be well used when the doctor together with his understanding of their nature shall understand also what man is, what life is, and what constitution and health are. Know these well and you will know their opposites; and when this is the case you will know well how to devise a remedy." We nominate this sentence for use as a bronze plaque to adorn the entrance to the amphitheater in the medical school.

The earliest description of a mineral cycle in nature that has come to our notice is that of Leonardo concerning salt. Mines "like that in Hungary where the salt is hewn out of immense quarries just as blocks of stone are" provide this vital commodity to man and animal; the salt is returned to the soil in the excretions, runs off through river systems to the sea where, after long ages, deposits of salt may be elevated to form future salt mines.

With all his radiant personality, his incomparable genius, and his vast knowledge, however, Leonardo had his flaws, and the greatest of these was the very diversity of his talents, leading or driving him into so many channels in the endless quest for learning that he never completed even a small fraction of the tasks he planned. We must admire him for what he knew and could do more so than for what he did. Had he concentrated on fewer outlets and placed a higher value on definiteness of purpose, he doubtless would have finished the Sforza monument and the *Battle of Anghiari* painting, or the textbooks of human anatomy and aerodynamics, or executed completed canals and cathedrals, or left behind numerous engineering and architectural masterpieces.

As it ensued, he was excelled in output in painting and sculpture by his rivals, Michelangelo and Raphael, while Vesalius became the founder of modern anatomy, Copernicus of heliocentric cosmogony, Vesalius and Copernicus together are credited with the overthrow of authority in the renaissance of science, Bacon gets the praise for establishment of the scientific method, Galileo initiated modern experimental science in the realm of physics, Newton (among many productions) worked out the laws of motion and of gravitation and dispersion of light into the prismatic colors, Huygens invented the pendulum clock, Fermat devised the principle of least time, Hooke the visual angle, Mercator the world map, della Porta the camera obscura, and Harvey circulation of the blood, every single one of which great advances was either actually accomplished but unpublished, or else foreshadowed by Leonardo in such a way that it is conceivable he could have achieved a similar result. All he lacked for some sort of development of airplanes, tanks, submarines, and other appliances considered strictly modern was a suitable motive power.

But instead of being the founder of all or certain of these lines of progress, he is actually the father of none. Instead of finishing a painting and collecting his fee, he would dawdle over his cartoon for the painting and stall off impatient customers while dissecting animals, squaring the circle, or experimenting in acoustics. One result was his continuous poverty. "No imaginable strength of any single man would have sufficed to carry out a hundredth part of what Leonardo essayed," states Colvin.

A curious habit of Leonardo's remains obscure. All of his notes are written in a very fine hand, nearly always from right to left, the letters reversed, so that his manuscripts must be held before a mirror to read them. This mirror writing might be used by a child as a means to conceal the meaning from other children, but it can hardly be supposed, as some have claimed, that an intellect of the gigantic stature of the great Florentine's would use so simple a scheme if disguise was the motive. There is other evidence that Leonardo was left-handed, and this seems the most likely explanation. The writings are accompanied by innumerable sketches or maps, or the drawings are often overwritten, the purpose being to illustrate his notes and discussions, as an artist can so readily do. "Webbed glove for swimming in the sea," writes Leonardo, with a sketch of this invention. Was he envisioning Miami in 1952, where the goggle-fisher uses a similar device on his feet?

How vain the bombast of monarchs by comparison with men like the wizard of Florence. Frederick the Great, Catherine the Great, etc., etc. Great in what? Rather it is Leonardo the Great and Shakespeare the Great. The world can

do with more Leonardos and Edisons and Platos, and fewer Hitlers and Stalins. We celebrate Leonardo's five-hundredth anniversary this year and he will rank as high among the immortals when his thousandth shall have arrived.

"O Leonardo, why do you toil so much?"

Apology

We must apologize for the liberties we took with *Mona Lisa* in the March issue. An engraving was made from a reproduction of the original painting and rushed to the printer. The engraver used what is known as a prism camera, which made a reverse negative, making *Mona Lisa* look in the opposite direction from which Leonardo painted her. In making the positive she was not turned again, and out she came, belying the Louvre and all published pictures.

MICROTECHNIQUE

THE *Microtomeist's Vade-Mecum*, a copy of which is essential for every serious worker with the microscope, was first published in 1885 by Bolles Lee. The intervening years have seen many editors and collaborators come and go, but there are still parts of the book that were the work of Lee. The last previous (10th) edition was issued in 1937, with Gatenby and Painter as editors. Now, with the 11th edition, Dr. Painter has had to relinquish his part in editing owing to his elevation to the presidency of the University of Texas. Dr. H. W. Beams, Iowa State, now becomes junior editor.

The revisions are numerous. Chapters on staining and tissue culture have been omitted, and in their place appear new ones: Laboratory culturing of invertebrates by Dr. Libbie Hyman; fats, by Drs. Whitehead and Kay; microchemistry of substances other than fats, by Dr. Gomori; while glands, by Dr. Leach, and blood, by Dr. Pickles have been greatly revised. An unanticipated feature is the retention of a number of old methods because they are experiencing a revival in popularity, as in the use of terpineol.

It should be stated that this large volume is not suitable for beginners or for hobbyists and technicians whose chief preparations for the microscope are whole mounts. Rather the *Vade-Mecum* is an encyclopaedia of reference, and includes thousands of special methods for the many kinds of cells, tissues, and organs, and in the many stages and groups of animals and plants. If you want to find out how specialists have stained for glycogen, prepared the retina, demonstrated flagella or reticulocytes, or find the answer to myriads of questions in microtechnique, then you need this internationally famous book. It is kept amazingly well up to date, is expertly written, edited, and printed. Pp. xiv, 753; frontis., figs. 7. The Blakiston Co., 1012 Walnut St., Philadelphia 5, 1950. \$8.50.



Major Carl L. Sitter, usmc



Medal of Honor

THE HILL WAS STEEP, snow-covered, 600 feet high. Red-hot, it cut our H'line route from Haguenau to the sea; it had to be in our hands.



Up its 45-degree face, Major Sitter led his handful of freezing, weary men—a company against a regiment! The hill blazed with enemy fire. Grenade fragments wounded the major's face, chest,

and arms. But he continued leading the attack, exposing himself constantly to death. Landing his men by his personal courage. After 36 furious hours the hill was won, the route to the sea opened. Major Sitter says:

"Fighting the Communies in Korea has taught me one thing: In today's world, peace is only for the strong! The men and women of America's armed forces are building that strength right now. But we need your help—and one of the best ways you can help us is by buying United States Defense Bonds."

"So buy Defense Bonds—and

more Defense Bonds—starting right now. If you at home, and we in the service, can make America stronger together, we'll have the peace that we're all wanting too!"

★ ★ ★

Remember, when you're buying bonds for national defense, you're also building a personal reserve of cash savings. Because the fact is, if you don't save regularly, you probably won't have as much money you want to use in your retirement. So start saving on the Payroll Savings Plan where you work, or use Bonds A-B-C's if you don't work there. For more details, contact your local bond, tax, defense bonds office.

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